Prime Hook NWR - Narrative Report -
1970

PRIME HOOK

National Wildlife Refuge

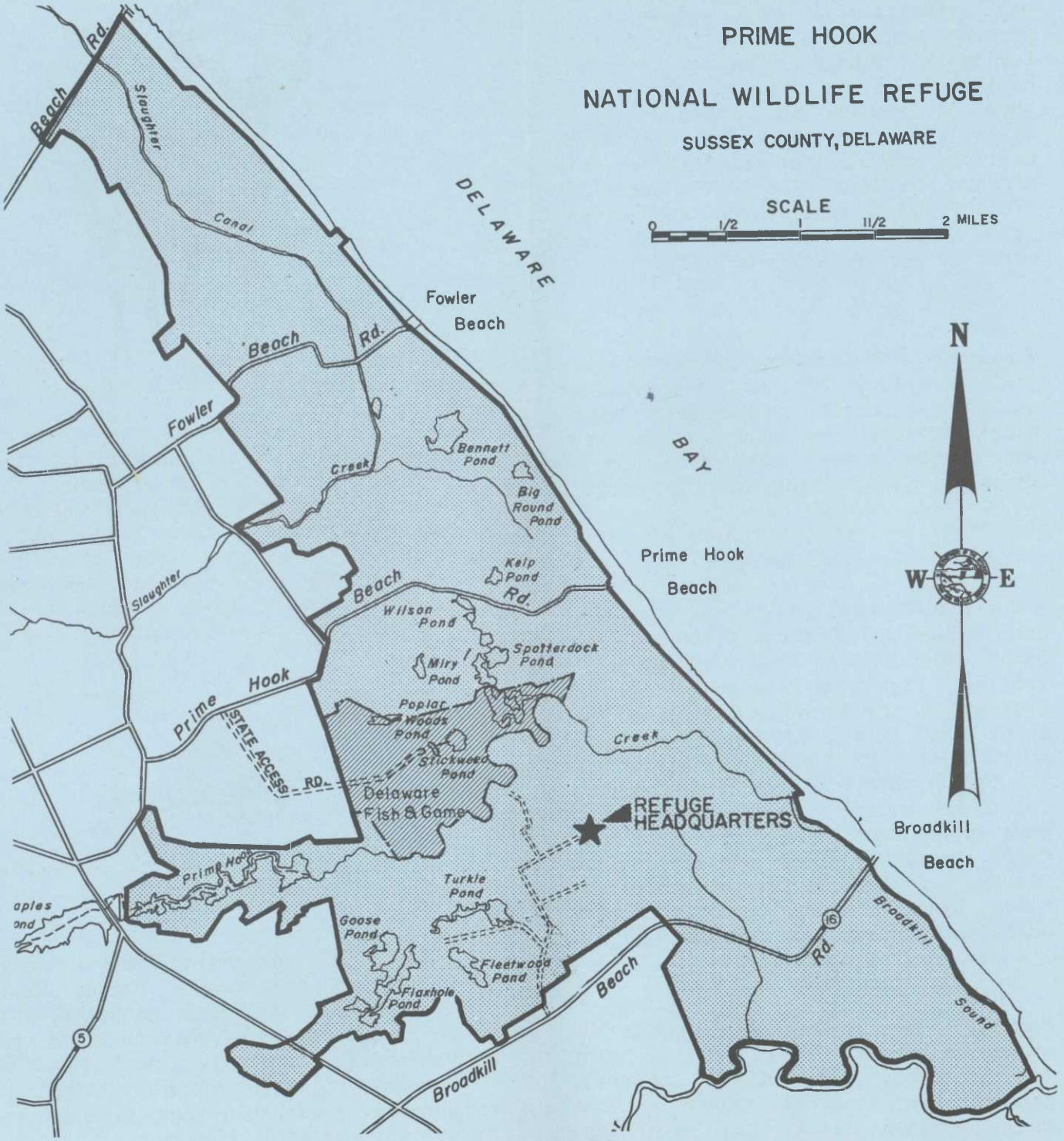
THINGS TO DO ON THIS REFUGE

FISH--four convenient sites.

BOAT-LAUNCHING--four areas provided.

CANOEING--over 15 miles of canoe waterways.

OBSERVE & PHOTOGRAPH--waterfowl, shorebirds, muskrats, and many other species of wildlife in their natural habitat.


PRIME HOOK
NATIONAL WILDLIFE REFUGE
SUSSEX COUNTY, DELAWARE
SCALE
0 1/2 1 1 1/2 2 MILES
N
W E
DELAWARE BAY
Fowler Beach
Prime Hook Beach
Broadkill Beach
Beach Rd.
Slaughter Canal
Fowler Beach Rd.
Fowler Creek
Bennett Pond
Big Round Pond
Kelp Pond
Prime Hook Beach Rd.
Wilson Pond
Miry Pond
Spotterdock Pond
Poplar Woods Pond
Stickweed Pond
Creek
STATE ACCESS RD.
Delaware Fish & Game
REFUGE HEADQUARTERS
Turkle Pond
Goose Pond
Fleetwood Pond
Flaxhole Pond
Broadkill Beach Rd.
Broadkill Sound
Broadkill
Prime Hook
5
16

The Prime Hook National Wildlife Refuge was established in 1963 primarily to preserve coastal wetlands that are historically of high value as waterfowl habitat. It is located on the west shore of Delaware Bay, approximately 22 miles southeast of Dover, the State capitol, and 64 miles southeast of Wilmington, Delaware. The 10,700 acres include 7,300 acres of marsh and water; 1,200 acres of timber and brush; 2,100 acres of pasture and cropland.

Management. Since the marshes are now good waterfowl habitat, improvements will be essentially limited to scattered pothole development, provision for nesting sites, and production of crops as food for migratory waterfowl.

WILDLIFE

The varied marsh habitat of the Prime Hook Refuge provides homes for numerous birds, mammals, and fishes of many species. Migrating waterfowl concentrations in the spring and fall, on or about March 15 and November 1, are spectacular. Many waterfowl winter on the refuge, providing wintertime viewing to the nature enthusiast. The rare osprey nests along Prime Hook Creek, Broadkill River, and Petersfield Ditch. A variety of herons, shorebirds, terns, and song birds provides additional interest to the visitor.

Mammals. Resident mammals include the white-tailed deer, red fox and gray fox, raccoon, river otter, muskrat, opossum, gray squirrel, eastern cottontail, striped skunk, and woodchuck.

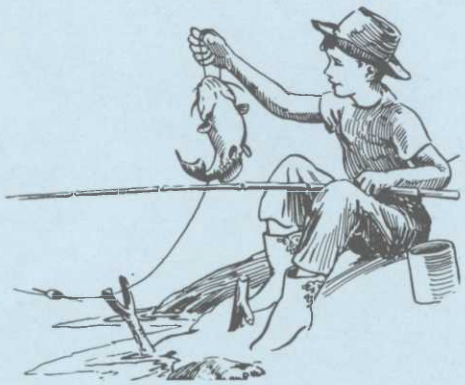
Muskrat houses are notable and abundant throughout the marsh areas. Their activities benefit waterfowl and other wetland species by their eating out small clearings into dense water-surface vegetation. Their houses provide nesting and loafing sites for waterfowl and other birds.

Birds. Of particular interest during migration are Canada geese, black ducks, mallards, and pintails, while several species of waterfowl and other waterbirds commonly nest in the marshes. A large variety of song and insectivorous birds may also be seen by the careful observer.

PUBLIC USES

FISHING--All freshwater streams and ponds throughout the refuge are open to sport fishing in accordance with state regulations. Largemouth bass and pickerel are most sought after and abundant. Favorite sites are Prime Hook Creek, Petersfield Ditch, Turkle Pond, and Fleetwood Pond.

Warm-water fish are plentiful in Turkle Pond, Fleetwood Pond, Headquarters Ditch, and Waples Pond. Largemouth bass and pickerel are most popular with fishermen.



CANOEING--Over 15 miles of streams and ditches provide the canoe-enthusiast with hours of potential pleasure. Favorite routes are along Prime Hook Creek and Petersfield Ditch.

BOATING--Permitted in all freshwater areas. Boats may be launched from designated access points along public roads and at Turkle Pond, Fleetwood Pond, Headquarters Ditch, and Waples Pond.

SIGHTSEEING--Vehicle travel provides delightful sightseeing opportunity on refuge roads in all seasons. Frequently waterfowl and shorebirds are best observed from the shaded interior of an automobile.

HIKING--Hiking is permitted in all areas except those marked closed by posting. Hiking is a pleasurable and healthful exercise which provides the finest viewing of a refuge and its wildlife in undisturbed activities. Foot-access into wooded areas is best from Headquarters Road and Turkle Pond and Fleetwood Pond Roads.

PHOTOGRAPHY--The hiking trails and vehicle routes all offer excellent opportunities for wildlife photography. Waterfowl, shorebirds, muskrats, and many other species of wildlife may be observed relatively undisturbed in their natural habitat. The Broadkill Beach Road is excellent for observation of feeding shorebirds. Other areas of interest are along Slaughter Beach Road and Fowler Beach Road.

Hunting is permitted in certain seasons in accordance with state and special regulations. Further information is available at refuge headquarters.

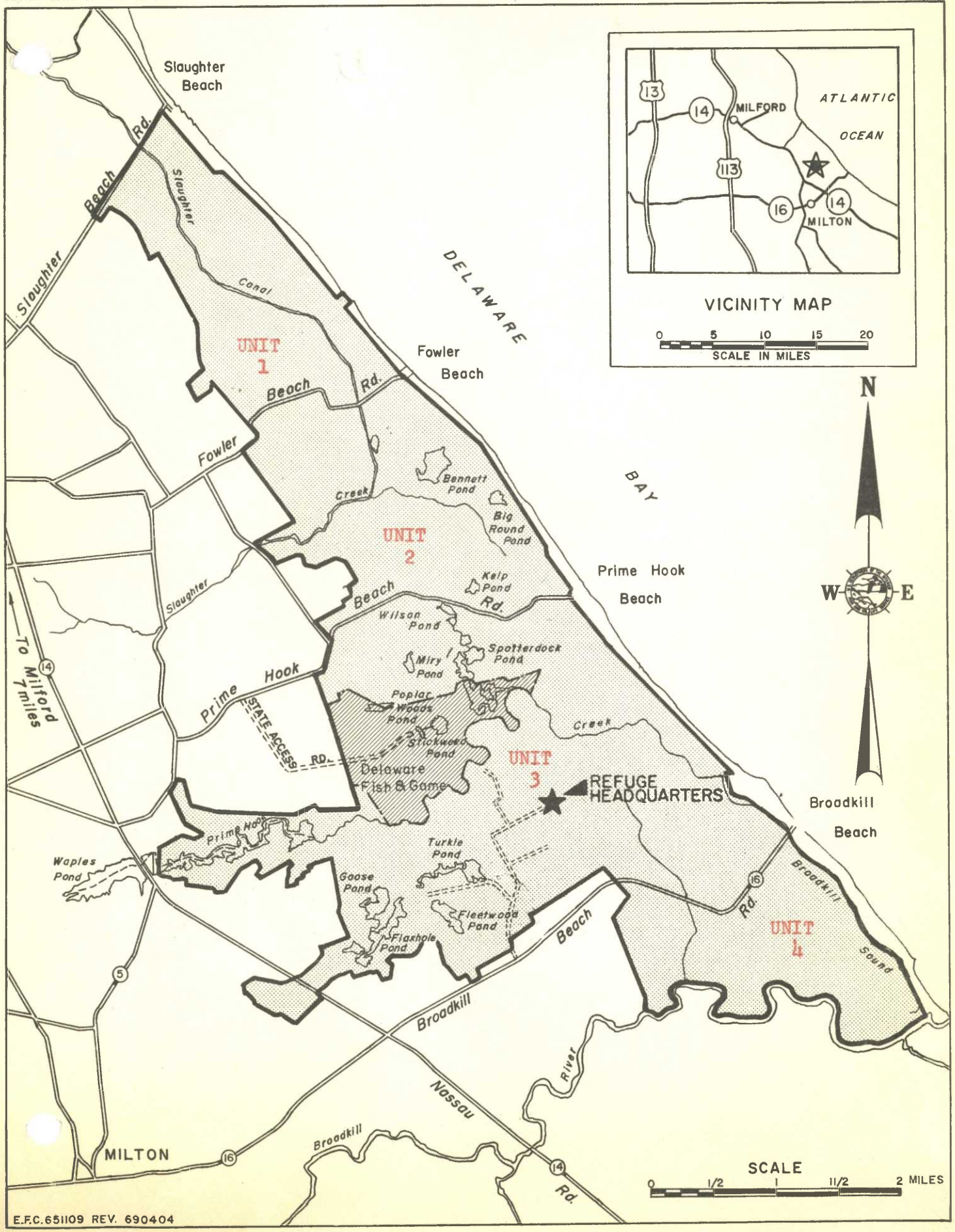
Additional information and current regulations may be obtained Monday through Friday at Refuge Headquarters located 1.6 miles north of Broadkill Beach Road, Route 16. Correspondence should be addressed to Refuge Manager, Prime Hook National Wildlife Refuge, Box 195, Milton, Delaware 19968. The telephone number is (302) 684-8419.

PRIME HOOK NATIONAL WILDLIFE REFUGE

SUSSEX COUNTY, DELAWARE

UNITED STATES
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



E.F.C. 651109 REV. 690404

NARRATIVE REPORT

PRIME HOOK NATIONAL WILDLIFE REFUGE

JANUARY - DECEMBER 1970

REFUGE PERSONNEL

Robert G. Nelson	Refuge Manager
George E. Gage (Term. 6/4/70)	Asst. Refuge Manager
Richard F. Nugent (EOD 6/15/70)	Asst. Refuge Manager
William H. Sipple	Maintenanceman
Otis J. Clifton	Maintenanceman (Temp.)
Eugene J. Moore (10/31/70 - 1/1/71)	Laborer (Part-time)

Norman E. Holgersen (Stationed at Bombay Hook)	Wildlife Biologist
Virginia E. Baughman (Stationed at Bombay Hook)	Refuge Clerk
Joan C. MacDonald (Stationed at Bombay Hook)	Clerk-Steno. (Temp.)

The Prime Hook National Wildlife Refuge is administered through the Bombay Hook National Wildlife Refuge, Smyrna, Delaware.

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES & WILDLIFE
SUSSEX COUNTY, MILTON, DELAWARE

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NARRATIVE REPORT
PRIME HOOK NATIONAL WILDLIFE REFUGE
JANUARY - DECEMBER, 1970

I. GENERAL

A. Weather Conditions.

Month	Precipitation Inches 1970	Normal	Snowfall Inches		Temperatures Max.	Min.
January	2.48	2.94	11		64	-2
February	2.96	3.50	2		54	9
March	4.13	4.34			68	18
April	4.97	3.29			76	27
May	2.40	2.93			86	32
June	5.14	4.14			90	44
July	3.28	5.74			90	59
August	1.27	5.11			94	57
September	1.07	3.69			96	51
October	5.11	4.13			81	36
November	3.96	3.72			64	18
December	3.43	3.64	3		64	14
Totals	40.20	47.17	16	Extremes	96	-2

The "normal precipitation" figures were compiled by the U.S.D.C. Weather Bureau from 1954-62 at Lewes, Delaware. An updating for the norm base-figures, from the Lewes' Weather Bureau, was unsuccessful. Climatological data has been collected at Refuge headquarters since June, 1967. Sufficient data should be accrued by 1972 to attain an independent Refuge "normal precipitation" figure based on a five-year average.

The year's first and worst snowfall came on January 7 accumulating 8 inches. Temperatures plummeted into the single numbers on six separate days; that, coupled with gusty winds, produced a half-dozen uncomfortable "wind-chill" factor indices.

February was interspersed with precipitation: seven rainfall-days and three snowfall-days -- the last flakes appearing on the 16th -- not to reappear for ten months.

March was seasonal with daytime temperatures normally reaching the mid-forties; precipitation occurred in an almost predictable fashion -- averaging a measurable amount every third day. The month terminated with wind velocities peaking at 70 M.P.H..

April was characterized by damp, foggy weather coupled with wind and thunderstorms. The sun shone only four days during the month. The Refuge's noncontrollable water levels evidenced an unseasonal high, as caused by the combination of wind tides, moderate temperatures, and heavy precipitation.

The last frost of the year occurred on May 7. Marsh water levels remained high and impeded agricultural practices, by the cooperative farmers, on adjacent lower-level terrain.

June was a soggy month. In retrospect, even more rain would have been advantageous in order to raise the water table; which for the succeeding three months dropped drastically. A severe wind/rain storm occurred on the 18th and wreaked havoc to an up-until-then successful osprey nesting attempt.

July 4 will be remembered for its gusty thunderstorm that damaged many trees, toppled roadside billboards and flipped several house trailers. During the last week, the relative-humidity readings hovered in the upper 90's. This coupled with a stagnant-air inversion made for extremely high discomfort indices.

August's drought started to take its toll as first evidenced by the extremely low marsh water levels, and later by the dehydration of the Headquarters' lawn.

September's dearth of precipitation compounded August's deficit. Many small land-locked pools evaporated into parched depressions. There were seven days in which temperatures peaked at 90°F or higher; fire hazards were extremely high. Prime Hook Creek water levels dropped 14" below normal.

In late October, the rains finally came. If precipitation had been delayed any longer, the Refuge's waterfowl hunting program would have been severely limited: only half of the twenty-six water blinds were accessible by boat prior to the rains. At the onset of the 1970-71 waterfowl hunting season (October 31), all water blinds were accessible -- even though push-poling was necessitated for certain areas.

On November 4 a hail storm deposited its frozen nuggets ranging in size to one-half inch. The first frost of the season occurred on November 6, when temperatures dropped to the freezing point.

A white Christmas was missed by a single day when on December 26, two inches made a wintery wonderland.

B. Habitat Conditions.

1. Water.

The Refuge has no water-control structures and therefore has no control over its water levels. Subsequent to the eventual termination of all litigation that affects potentially favorable structure sites, the Refuge would be able to have some degree of manageability over its water resources. During the drought of August and September, it was disheartening to witness the continual lowering of Prime Hook Creek, caused in part by the flowage loss of the unimpeded Petersfield Ditch which empties directly into the tidal Broadkill River. The Creek's water depletion became so extreme that moon tides and storm waters back-washed up the creek a minimum of three miles and, in effect, made the former fresh-water creek tidal with water levels fluctuating some six inches.

2. Food and Cover.

The 1969 fall waterfowl population was low and the available food supply was high -- resulting in an ample forage carry-over.

After a January freeze-out the geese and ducks returned in good numbers feeding on and off the Refuge. All chopped corn was fully utilized by late February (Table 1). Duck feeding activities were concentrated in the flooded fields, whereas the geese favored the higher, dryer terrained rye grass and wheat fields. The thirty acres of green wheat browse were quickly browsed.

During the latter park of February, the ten acres of standing corn were chopped to alleviate off-Refuge depredation feeding. As waterfowl had not utilized any of the standing corn in the fall of 1969; an estimated 800 bushels of eared corn were made readily available to spring migrants. The ten acres were completely utilized in two weeks.

As Refuge food sources became depleted, the Canada geese found "greener pastures" elsewhere -- namely on the lands of adjacent farmers. Two depredation calls were received: the loaning of a "Zon Exploder" seemed to quell any further complaints. The 1970 cooperative farming agreements included more provisions for spring wheat browse to

help bridge the usual two to three week period when no food was available. The palatability of rye cover crops apparently decreases at this late date and unless wheat browse is available the grazing pastures of the neighboring farmers are the "honkers" first choice . . . a situation that neither the Refuge nor farmers appreciate.

All migrant geese had left by May 7. For the next five months between 750 and 1,000 ducks nested and fed within the Refuge confines. Their natural food diet consisted of abundant smartweed, millet and sedge. Most submergent and semi-emergent aquatic plants e.g., bladderwort and pondweed of the land-locked pools were unavailable to the dabblers during the drought period.

The heavy goose utilization of the stubble corn is noted in Table II. The standing corn will not be chopped until the goose hunting season is terminated on January 21, 1971.

The utilization of the millet and buckwheat fields was disappointing. Both crops produced abundant seed but was little used due to the lack of water. It is anticipated that with the spring rains, the dabblers will be enticed onto the low-lying croplands and make use of the excellent seed forage.

Refuge: Prime Hook

TABLE I
PER CENT CROP UTILIZATION
January - April 19 70

Crop	Acres	As of Dec. 31	Jan. 1-7	8-14	15-21	22-28	Feb. 29-4	5-18	March 19-4	5-18	April 19-1	2-15	16-30
Corn (cereal), stubble	378	60	-	-	-	-	-	65	90	100	100	100	100
Corn (cereal), standing	10	10	-	-	-	-	-	-	50	100	100	100	100
Buckwheat (cereal)													
Millet (cereal)													
Wheat (cereal)													
Soybean (cereal)											x	x	x
(cereal)													
(cereal)													
Browse (wheat) (Green)	30	x	-	-	-	x	x	x	x	x	x	x	x
Browse (rye grass)	318	x	-	-	-	x	x	x	x	x	x	x	x
Browse (permanent grass)	360	x	-	-	-	-	x	x	x	x	x	x	x
Browse ( )													
Browse ( )													

Refuge: Prime Hook

TABLE II
PER CENT CROP UTILIZATION
October - December, 1970

Crop	Acres	October 1-7	8-14	15-21	22-28	November 29-4	5-11	12-18	19-25	December 26-2	3-9	10-16	17-23	24-31
Corn (cereal), stubble	327	-	-	25	50	75	80	80	80	80	80	85	85	85
Corn (cereal), standing	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Buckwheat (cereal)	7	-	-	-	-	5	5	5	5	5	5	10	10	10
Millet (cereal)	4	-	-	-	-	5	5	5	5	5	5	10	10	10
Wheat (cereal)														
Soybean (cereal)														
(cereal)														
(cereal)														
Browse (wheat)	76	-	-	x	x	x	x	x	x	x	x	x	x	x
Browse (rye grass)	280	-	-	-	-	-	-	-	-	-	-	x	x	x
Browse (permanent grass)	271	-	-	-	-	x	x	x	x	x	x	x	x	x
Browse (Rye)	22	-	-	-	-	-	-	-	-	x	x	x	x	x
Browse ( )														

II. WILDLIFE

A. Migratory Birds.

1. Waterfowl.

Canada Geese. Canada goose use was close to one million use days, the highest goose use in the eight year history of the Refuge. There were small increases in winter and spring use but the major increase occurred in the fall. The population built up during October to a record high peak of 26,500 geese at the end of the month. Numbers dropped sharply to 10,000 after the October 31 opening of the hunting season but remained above average the rest of autumn.

Large flocks inhabited all units during October with major feeding concentrations in the corn stubble fields. As the autumn progressed, Units 2 and 4 were the most heavily utilized, with extensive feeding on the permanent grasslands.

Snow Geese. Up to 45 snow geese, more than in any past spring, fed on Unit 4 grassland during March and April. Fall migrant snow geese grazed on pastures in Units 2 and 4 from October through December, with a peak population of 125 in early November. A November flock of 41 contained 14 adults and 27 young, indicating a very successful breeding season.

Blue Geese. While blue geese were seen for the fourth consecutive autumn, there were only two observations, an adult pair and a solitary bird in October. A few blue geese were also present in mid-March.

Whistling Swans. No whistling swans were observed on the Refuge but a flock of 10 adults with 14 young were observed in adjacent Delaware Bay on November 21.

Ducks. Total duck use increased for the second consecutive year and the 482 thousand use days represented the highest use since establishment of the Refuge in 1963, exceeding the previous high of 433 thousand in 1966. The eight-year average for use days is 340 thousand.

Most of the use increase over 1969 occurred in the spring and summer, fall use was about the same and winter use decreased. Larger populations of mallards and pintails in early spring accounted for the vernal increase. Larger populations of black ducks, blue-winged teal, and wood

TABLE 3

CANADA GEESE

STATUS OF MANAGEMENT OBJECTIVES AND ACTUAL USE

GOOSE USE DAYS

	Objective Goals	Actual 1970 Use	Ratio Goal to Actual
Spring (2/16-5/15)	400,000	182,240	1 to .46
Summer (5/16-8/31)	5,000	None	-
Fall (9/1-12/31)	530,000	723,075	1 to 1.36
Winter (1/1-2/15)	Min. (65,000)	83,500	1 to 1.28
TOTAL	1,000,000	988,815	1 to .99

GOOSE PEAK POPULATIONS

	Objective Peaks	Actual 1970 Peak	Ratio Goal to Actual
Spring	-	6,000	-
Summer	-	None	-
Fall	12,000	26,500	1 to 2.20
Winter	-	3,000	-

TABLE 4

DUCKS

STATUS OF MANAGEMENT OBJECTIVES AND ACTUAL USE

DUCK USE DAYS

	Objective Goals	Actual 1970 Use	Ratio Goal to Actual
Spring (2/16-5/15)	800,000	235,035	1 to .29
Summer (5/16-8/31)	400,000	84,845	1 to .21
Fall (9/1-12/31)	2,100,000	121,390	1 to .06
Winter (1/1-2/15)	200,000	40,845	1 to .20
TOTAL	3,500,000	482,115	1 to .13

DUCK PEAK POPULATIONS

	Objective Peaks	Actual 1970 Peak	Ratio Goal to Actual
Spring	20,000	6,345	1 to .31
Summer	-	955	-
Fall	30,000	1,810	1 to .06
Winter	-	4,550	-

DUCK PRODUCTION

	Objective	Actual 1970 Prod.	Ratio Goal to Actual
Ducks	3,000	500	1 to .16

TABLE 5

WATERFOWL DAYS OF USE PER ACRE OF WATERFOWL USE HABITAT

1.	482,115 Duck Use Days, 1970	+ 2.	8,000 Acres of Duck Use Habitat	= 3.	60 Duck Use Per Acre of Waterfowl Habitat		
1.	988,815 Goose Use Days, 1970	+ 2.	8,000 Acres of Goose Use Habitat	= 3.	124 Goose Use Per Acre of Waterfowl Habitat		

Duck production per wetland acre, 1970 - 0.07

ducks caused the increase in summer use. Winter use declined because there were no large flocks of pintails in late January and early February this year.

The spring duck peak of 6,345 was the highest in the history of the Refuge while the fall peak of 1,810 was the next to lowest. The average spring peak is 3,600 ducks and the average fall peak is 2,900. In the past four years the fall peak averaged only 1,830 ducks compared with an average of 3,870 the preceding four years.

It was a good nesting season with ample water and cover on the marsh. The estimated production was 500 ducks with the black duck and blue-winged teal again the leading producers.

2. Shorebirds and Other Waterbirds.

Unit 4 with its interspersed shallow ponds, potholes, marshes and pastures again had the best variety of shorebirds, long-legged waders and other waterbirds. It was especially attractive to fall migrant shorebirds this year as the receding water levels during the hot, dry summer created ideal feeding conditions. Good populations were present from late July through September with the peak in mid-August. The most abundant species in that period were semipalmated sandpiper, greater yellowlegs and dowitcher. Fall observations of the avocet and the Northern phalarope were the first Refuge records.

Black-bellied plovers were again common on the Unit 4 grasslands in the fall with a peak in early November. Some of the rarer golden plovers were also present and buff-breasted sandpipers, seen only one other year, were observed three times in September.

Despite the excellent fall feeding habitat in the ponds, most of the conspicuous species of long-legged waders were absent or present in low numbers. The snowy egret was an exception, with 250 feeding in one Unit 4 pond in mid-September. Two observations of an immature white ibis in August added a new species to the Refuge avifauna.

3. Other Migratory Birds.

The Refuge provides excellent habitat for mourning doves. Woodland thickets and hedgerows furnish nesting sites, numerous cropped and fallow fields provide feeding areas, and thickets of red cedar and brush supply roosting sites. Four-hundred doves roosted in thickets along the northeastern boundary of Unit 3 in late summer.

A varied rail fauna was present; Virginia and king rails, were seen about the ponds on Units 2 and 4, sora rails were noted along Prime Hook Creek, clapper rails were observed in the salt marsh, and the elusive black rails were heard in the salt meadows on Unit 4.

B. Upland Game Birds.

Ring-necked Pheasants. A single cockbird was sighted this year prior to the State Division of Fish and Wildlife's release of 113 cock-bird pheasants within Unit #3 for its "Special Pheasant Hunt" October 10-17. The "loner" was probably a carry-over from last years' State release of 102 cocks.

There appears to be an idiomatic axiom that the pheasant cannot adequately maintain a viable, self-sustaining population in Delaware's lower counties. People contend that the major limiting factor is the scarcity of calcium in the soils. This contention is questionable as a former Refuge landowner, Mr. William Ford, raised pheasants and bobwhite quail for a livelihood for over thirty years. Invariably, a certain number of birds escaped. Feral pheasant broods were frequently observed in the general area of the gamefarm. Hunters finally decimated the population.

Bobwhite Quail. This year, as in the past, the bobwhite thrived on the Refuge, particularly in Unit III. Several coveys, numbering eighteen-plus individuals, were sighted. The quail hunters might dispute the species' relative abundance based on their limited hunting success. The innate coyness of the bird, coupled with its tactics of retreating when pressed, to the unflushable marshland areas, appear to assure its numbers.

C. Big Game Animals.

White-tailed Deer. The Refuge supports a transitory population of white-tails, averaging in the fifties. Their mobility is influenced by the annoyance of tabanids and mosquitoes, the local "fox" hounds, and by hunters.

The Part II saga of the "fairy-toed" doe, with its six-inch recurving hooves, was concluded in February. For the preceeding seven months this deer had been observed in the vicinity of the then residence quarters. In mid-February, a pack of fox hounds was seen chasing "ol' flounder-foot"; its right flank was bloodied; as gnashed by the hounds. No future sightings occurred, it is therefore deduced that she met her final demise.

D. Fur Animals, Predators, Rodents and Other Animals.

Muskrats. During the 1930's the annual muskrat catch in the Prime Hook marshes from the Mispillion River to Broadkill Creek was 25,000. By 1940 the productivity of this area was declining, a decrease attributed to vegetative changes caused by the flow of salt water through many breaks in the dunes along the Bay shore. The trend toward lower productivity continued into the 50's with the summer water shortage assuming importance as a causative factor. The lowered water table, caused largely by mosquito and agricultural drainage ditches, enabled undesirable vegetation such as phragmites and rose mallow to become established.

The effects of salinity were drastically demonstrated in the March, 1962 storm when salt flood waters killed many of the freshwater food plants favored by muskrats. Since that time portions of the marsh have freshened, good cattail and three-square growth is evident and the muskrat population has slowly increased.

Otter, Weasel and Mink. Otter tracks, scats and feeding platforms have been observed. No sightings of either the weasel or mink were noted this year. The presence of the weasel is not questioned but it is for the mink.

Fox, Raccoon, Opossum and Striped Skunk. All the above species are prevalent on the Refuge. The red fox is highly prized by the local fox-hound chasers and is a State protected species whereas its counterpart, the gray fox, is unprotected and is conversely present in fewer numbers.

Rodents. In addition to a cursory Refuge rodent listing compiled by Biological Technician, Warren Gass, during the summer of 1968 the Eastern Mole (dark phase), Norway Rat, and Southern Flying Squirrel have been observed.

Other Animals. A disabled three-foot long harbor seal was found adjacent to the Refuge, on the Delaware bay shore by a Broadkill Beach resident in early May. The external debilitating symptoms included a lesion of the head "about the size of a nickel", labored breathing, a heavy flow of phlegm from its nostrils, and a general weakness. The efforts of a local veterinarian failed to restore its health and it lived only two days.

E. Hawks, Eagles, Owls and Crows.

The red-tailed, red-shouldered, rough-legged, sparrow and marsh hawks were the only diurnal raptors observed. There were no records of accipiters or the other two falcons, the

peregrine and pigeon hawk. The early winter population of redtails was lower than in the past three years. During June a female marsh hawk with grass in her bill was seen in a Unit 4 broom sedge field and may have been nesting.

5 Three osprey nesting platforms were erected on poles, one each in Units 2, 3 and 4, to supplement natural nesting sites.
3 Ospreys nested on the Unit 3 platform and apparently hatched an unknown number of eggs but the nestlings did not survive a severe storm in mid-June. Ospreys placed sticks on the Unit 4 platform in late summer and hopefully will nest there next year.

The owls observed were the great-horned, barred, barn, screech and, in the winter, the short-eared. Barn owls made sporadic use of the barn on Unit 4 and roosted in the red cedar woods on Unit 2.

F. Other Birds.

On September 14 a female or winter-plumaged male lark bunting was observed with house sparrows amongst the cottages of Prime Hook Beach, just across the Refuge boundary. This is only the second Delaware record of this western species.

Another western species, the house finch, continued to increase and a flock of 125 was observed in late December. Released by cage bird dealers in the New York City area in the early 40's, the species now breeds in the wild and wanders widely in the late fall and winter.

In late September and early October, hundreds of thousands of tree swallows roosted in phragmites stands in Unit 3.

The Cape Henlopen-Prime Hook Christmas Count, which includes about 80% of the Refuge, tallied 119 species on January 3, 1971. This is the highest species total in the seven year history of the count.

G. Fish.

In compliance with a request from the Division of Fishery Services, Lamar, Pennsylvania, contour maps were prepared for the Refuge's four major freshwater-fished ponds. Depth soundings were obtained during January from atop the ice. Summarized results are as follows:

	Approx. Surface Acres	No. Soundings	Average Depth	Min. Depth	Max. Depth
Flaxhole	6	23	3.5'	2.3'	4.0'
Fleetwood	7	23	2.7'	2.1'	3.2'
Turkle	5	20	2.7'	1.8'	3.7'
Oak	3	12	2.1'	1.7'	2.6'

This data is to be used as ". . . a valuable fish management tool and will also be beneficial for you (Refuge) if water volume of a lake is needed to treat aquatic weeds, to rehabilitate the lake, or to fertilize properly."

Since the inception of a public fishing program in 1967 this form of recreation continued to be a favorite. All tidal ditches adjacent to the public roads were used by fishermen, women and children fishing for blue crabs.

Random checks showed fishermen to have good catches of white perch along the tidal ditches, and fair catches of pickerel and largemouth bass from the inland ponds.

H. Reptiles and Amphibians.

No new species were recorded. Several additional facts concerning some of the officially listed species are:

1. The green treefrog's natural northern range limit approximates mid-Delaware.

2. The diamondback terrapin, the "most celebrated of American turtles", according to Roger Conant's A Field Guide to Reptiles and Amphibians of Eastern North America, is making a successful comeback after its near decimation by market hunting at the turn-of-the-century. Much sought for their succulent flesh, the terrapin demand was so great that prices reached the exorbitant level of one dollar per longitudinal inch.

   On May 28, scores of adult terrapin were sighted on the exposed mud banks of the Broadkill River -- the southern boundary of the Refuge. Groupings of twenty to thirty were commonplace.

   On September 1, a newly-hatched terrapin was seen making its way across the Broadkill Beach Road.

3. The season's earliest snake sighting was on January 3, when a Northern water snake was observed; the latest, a ribbon snake on October 31.

4. On September 4, hundreds of southern leopard frogs were seen in Unit II (Tract #34). A rough estimate of their abundance was 200 individuals per 300 feet of roadway.

For the second consecutive year Mr. William E. Brown was issued a snapping turtle trapping permit. During a concerted six-day period he fyked 169 snappers weighing a total of 2,388 pounds (average 14 lbs./turtle). This was an impressive catch to the novice but a disappointment to a "pro" like Mr. Brown when he considers his 1969 Refuge catch of 7,882 pounds. The selling price dropped from last year's .20/lb. to .18/lb.. With all facts considered, Mr. Brown believes that he will terminate his Refuge turtle trapping -- the decisive factor being his daily traveling distance of 40 miles to check his traps. Many ducks are, none the less, grateful for his past efforts and results.

I. Disease.

In December several hundred Canada geese were observed dead and dying in Unit IV. Some of these geese had been crippled by hunters and others exhibited symptoms of lead poisoning which has occurred on the Refuge in the past. Of seven birds examined, two had lead shot in their gizzards and six had food impaction in their digestive tracts.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development.

1. Real Property.

A single, wood-frame house (R.P. #221) was removed from Tract 34 on April 28. The off-site sale was conducted last year. Building sites were cleared and debris removed through an informal contract by August 27.

A subsequent 2:2:1 wildlife/pasture seeding of Kentucky #31 fescue, orchard grass, and Ladino clover, respectively, on the one-acre former farm site was performed by a cooperative farmer.

In February a poultry shed (R.P. #228) from Unit IV was razed as it was a public safety hazard.

2. Buildings.

a. Headquarters and Surrounding Area.

Improvements and additions included: (1) a 35-foot flag pole with concrete base was erected; (2) the locally historic cemetery was given a face lifting via shrub and tree thinning, stumpage removal, and preparations made for reseeding by adding lime and fertilizer. A monumental plaque is also scheduled; (3) spot-seeding of lawn; (4) re-roofing, shingling and painting of the equipment storage shed (R.P. #187); (5) painting of the water pump shed (R.P. #177), and the trim of the Headquarters (R.P. #191); (6) the installation of an air-conditioner and a ten-gallon electric water heater in the office, the additions of which tended to overload the then existing electrical capacity necessitating the installation of a new 100 ampere main-breaker panel with three 20 ampere circuits by contract.

b. Shop/Garage (R.P. #22).

The former two-car concrete block garage located on Tract #77a was renovated into a much needed shop/garage, encompassing 484 sq. ft.. This was a major improvement over the dilapidated 320 sq. ft. wood-framed shop (R.P. #26), a former incubation shed.

Renovations to Real Property #22 included: (1) removal of one fiberglass overhead doorway and the concrete-blocking of the resultant space, excepting for a 3' x 6½' doorway area; (2) construction of a 20' long, 3' wide, 3½' high

double-shelved workbench; (3) painting of the interior walls and work bench; (4) relocating the gas heater and 500 gallon capacity fuel tank from the old shop; (5) installation, by contract, of a 100 ampere panel-box; and the (6) affixing a 4' x 8' wall pegboard. The improvements occurred during November and December; to intercalate into 1971 by one month, further additions will include: (7) the installation of three double-electrical receptacles, two overhead florescent light fixtures, a bulletin board, and a celotex ceiling; (8) the erection of a 175-watt security light atop a 20' powerline pole.

c. Residence Quarters (R.P. #20).

Occupancy of the structure has been terminated. No refuge personnel currently reside on the refuge. The discontinuation of the building's use was determined, in part, by its location; it is isolated on the edge of a low-lying marsh with very poor drainage. The water is non-potable. A mildew-mold problem is persistent as are the spring, summer, and fall mosquito/fly populations.

3. Fencing and Posting.

Approximately 1,000 feet of broken barbed-wire fence were removed from Unit III grazing Field #329 and replaced with new fencing; a 14-foot aluminum gate was added for future grazing-control purposes.

On Unit III, Tract 80, Refuge personnel erected 155-feet of hog-wire fence adjacent to a private barnyard and completed linking former sections of contracted fencing by erecting 240 feet of four-strand barbed wire fence and reposting corners.

An office roadway-entrance fence was constructed and painted white. Each half of its symmetrically dichotomous form consists of: a 36' length, 4' height, is double tiered (with (1" x 6" planks), and is equi-spaced by seven 4" x 4" posts.

As in the past, boundary posting is abreast of acquisition.

Routine replacement of defaced and stolen signs occurred as required.

4. Roads and Trails.

In May, ten loads of gravel, approximately 60 cubic yards, were used to repair and upgrade existing roadways and parking areas in Units I, II and III. In addition, a contract for 500 cubic yards of gravel to be spread and graded in place on

the .4 mile long shop road and 300 cubic yards to be spread on a .25 mile-long access road, on Tract 12, was completed. A 32-foot, 18-inch, culvert was laid under the latter road to improve farmland and roadside drainage.

Between May and September, an additional 120 cubic yards of select bar material were placed and spread atop the already located sod-roadside material that had been laid (gratis) in 1969 by the Delaware State Highway Department to cover a former dump-site adjacent to the Fowler Road bridge. These efforts produced a 75' x 50' x 2' public parking area, three sides of which are enclosed by six-foot sections of cement parking-block lintels. A redwood "Parking Area" sign and a trash barrel were placed for the convenience of the Refuge visitor.

In September, Refuge personnel hauled, placed, and leveled 28 cubic yards of sand-fill on the roadway leading to Tract 34a.

Sign erections, other than the Bureau's standardized ones (i.e., boundary, public hunting, public fishing, etc.) included: (a) two redwood signs: a directional sign to the Fleetwood-Turkle Pond area, and a "Visitors Welcome Dawn to Dusk" sign with the back side displaying the multi-colored Bureau shield with the motto: "Come Again, Drive Carefully"; (b) five limited-speed zone signs; (c) one Smokey-the-Bear "Prevent Fire" sign; (d) two additional "This area of refuge closed to Waterfowl Hunting"; (e) one "No Access -- Violators Will be Prosecuted" sign (on grazing Unit IV); and (f) a redwood "Shop" sign.

The sand-gravel interior roadways of Unit III were graded as necessary and a total of two tons of calcium chloride was spread.

5. Waterways and Drainage Facilities.

A soil and moisture funded contract was issued for the re-ditching of a 250 foot long, 12 foot wide, 4 foot deep waterway on Tract #51.

Another soil and moisture contract was let for a 1,250 ft. tile drainfield at refuge headquarters. The job included a 500 foot main and three laterals using four inch land tiles and tees. A 20 foot outlet pipe was installed and proper fall maintained throughout the drainage system. The tile was covered with fiberglass tile guard and 50 tons of bank-run gravel backfilled into the trench.

6. Maintenance and Equipment.

Routine 3,000 mile and 5,000 mile vehicular checks were maintained throughout the year. Specific repairs occurred as follows:

(a) 1965 Chevrolet 4 x 4 Pickup: a cracked windshield was replaced, the radiator was spot-welded, a new throw-out bearing was installed, and the tail light assembly was rewired;

(b) 1964 Dodge Pickup: installed manifold;

(c) OC-3 Tractor: the carburetor and magneto were rebuilt and the main-leaf spring was replaced;

(d) D-4 Dozer: an oil cooler was installed;

(e) JD-1010: entire engine was overhauled, a new hydraulic pump, water pump, and muffler were installed;

(f) Mower: a spindle shaft to the three-blade Liliston mower was replaced; and

(g) Boats and trailer: the 14' V-bottom Gruman boat, 12' canoe and boat trailer were repainted.

B. Plantings.

1. Aquatics and Marsh Plants. None

2. Trees and Shrubs.

Four, four-foot Norway Spruces were transplanted from Tract #75 to the headquarters area. The dwarfed evergreens are approximately fifteen years old, their height stunted by a dense hardwood overstory. Eight, five-foot Atlantic red cedars were similarly transplanted from Tract #85 and presently enhance two redwood signs, two corners of the headquarters parking lot, and the newly constructed office entrance-road fence.

3. Upland Herbaceous Plants.

Ninety tons of ground limestone were spread, by contract, on 90 acres of Field #203, a wildlife pasture.

Refuge personnel seeded one acre of wildlife pasture on Tract 78a, and reinforcement seeded five acres of wildlife pasture on Tracts 54 and 57.

The following services were performed by the Refuge's five cooperative farmers:

	Acres
Sowing buckwheat/millet	12
Sowing browse wheat	76
Sowing browse rye (cover cropping)	22
Sowing browse rye grass (cover cropping)	280
Liming (one ton/acre)	49
Establishing wildlife pasture	3
Maintaining wildlife pasture (mowing)	247
Top dressing wildlife pasture	16

4. Cultivated Crops.

For the fifth consecutive year the farming was carried out by cooperative farmers. Acres tilled or maintained have risen from 95 in 1966 to 689 in 1970, and will continue to increase as final land acquisition is realized.

A total of 44 soil samples was taken from the agricultural lands for pH, phosphorus, potassium and magnesium content analyses. Fourteen samples were gathered in preparation for the 1970 farming program, and thirty were taken in December for the 1971 program.

Field planting operations were severely hampered by the heavy spring precipitation. Only ten acres of Refuge land had been tilled at the end of April. The cooperative farmers were still having tillage problems in low-lying areas throughout May. Farmers planted 327 acres of corn and 49 acres of soybeans; they, however, did not harvest all of the tilled acreage -- nearly 60 acres of corn in Unit II were economically unharvestable due to the corn's dwarfed height. An estimated 1,200 bushels of unscheduled, surplus corn was left afield. The corn harvest was considered below average - 50 to 55 bushels per acre. The nationally publicized 1970 corn blight did not measureably effect the Refuge farmers' harvest--though present in limited amounts. No infestations of the corn borer were noted. Approximately one-half of the soybean crop was unharvested due to the fields' wet condition. The area that was harvested yielded only five bushels/acre.

Other harvested vegetation included:

Vegetation	Acreage	Method
Pasture Hay	2	Coop. Farming Agreement
Saltmarsh Hay	15	Special Use Permit

Alfalfa	11	Special Use Permit
Timothy-Clover Hay	15	Special Use Permit

In addition to the already mentioned services rendered by the cooperative farmer, in Section III.B.3 (Upland Herbaceous Plants), the following commitments were also met:

Service	Acreage
Fallowing Field #321	46
Standing Corn	7
Liming (one ton/acre)	49

C. Collections and Receipts.

1. Seeds and Other Propagules. None

2. Specimens. A mounted red-breasted merganser (male) was acquired from Mr. Patrick Grace, an amateur taxidermist/post-graduate student of the Pennsylvania State University.

D. Control of Vegetation.

Johnsongrass. On June 29, 1970, State Senate Bill No. 742 was passed which makes it ".... unlawful to knowingly contaminate uninfested land . . . to knowingly allow Johnsongrass to set seed . . . . ". Any person(s) found ". . . guilty of a misdemeanor, and upon conviction thereof shall be fined not less than $50.00 nor more than $500.00, on each count". The Bill was not enacted to be punitory, but to gain the attention of the public and educate them as to the potential hazards of the plant. To date, no convictions or apprehensions have been made State-wide, even though the "seed-setting" problem has been quite prevalent.

The Refuge has in no way been spared of its share of Johnsongrass problems. Spot infestations have been observed in several fields. A localized clone was hand-pulled and dug from Field #313; in Field #321 an infestation was so intense as to warrant fallowing, one-third of the 47 acres of this field being infested.

Combined efforts of Refuge personnel and a cooperative farmer failed to keep the weed in check. Efforts included: spring-tooth harrowing; two applications of Dalapon (8 lbs./50 gal. of water with a suffactant) with a boom-sprayer and hand-wand; and plowing under during late summer to expose the rhizomes. The weather was against us for the most part, i.e., when mechanical or chemical controls were scheduled, rainy weather would delay the control program. When the spraying was finally accomplished, rain would invariably follow, washing and cleansing the weed of the chemical.

An all-out effort for Johnsongrass control is planned for 1971, utilizing guidelines as set forth by the Cooperative Extension Service of the University of Delaware (Extension Bulletin No. 102), in coordination with the Refuge's Chemical Control Proposals.

Purple Loosestrife. Purple loosestrife was first discovered on the Refuge in the summer of 1968 when small patches totaling two to three acres were found in Unit 2. In 1969, with increased reconnaissance, additional scattered plants and small clumps were located elsewhere in Unit 2 and in Units 1 and 3, with a total estimated infestation of four acres. The 1970 distribution of purple loosestrife was similar to that in 1969, most of it occurring in large patches and as scattered plants on 24 acres in the northeastern quarter of Unit 2. Continued spread of this species could crowd out beneficial waterfowl food plants such as smartweeds, wild millet and saltmarsh bulrush. The loosestrife was sprayed with a water solution of ammonium sulfamate, and though the brown, dead appearance of the plants was encouraging, a full evaluation cannot be made until the next growing season.

Spiny Pigweed and Thistle. Both plants abound within Unit IV. Sixty infested acres were mowed prior to the ripening of the seed. No Chemical Control Proposals will be prescribed for the area until the government has a clear title to it.

E. Planned Burning. None.

F. Fires. None.

IV. RESOURCE MANAGEMENT

A. Grazing.

Two individuals were again issued special-use permits for the grazing of their cattle during the non-conflicting (waterfowl-use versus cattle-use) months of late April through October. This six-month management tool has aided in maintaining open, non-brushy fields for goose grazing during the other six month period. A total of 360 acres is open to grazing. Pertinent statistics are as follows:

Permittee	Tract(s)	Acreage
J. Howard Isaacs	12	138
Island Farms, Incorporated	79 & 79c	222

A conservative carrying capacity limit as determined, in part, by a Soil Conservation Service Agronomist, has been set and adhered to by both permittees. A total of 1,446 Animal Unit Months grossed $2,051.75.

B. Haying.

A special use permit issued to J. Howard Isaacs for cutting up to 25 acres of marsh hay @ $2.00/acre for the second year. However, wet fall conditions prevailed and limited the cutting to 15 acres of relatively high land, producing $30.00 in return.

Another special use permit was originated for J. Nailor Wells, a cooperative farmer, to cut and remove hay from the following fields of Unit II.

Field No.	Acreage	Hay
204	11	Alfalfa
205	5	Timothy - Clover
206	10	Timothy - Clover

The above acreage was leased at $25.00/acre -- equalling a revenue of $650.00. Last year, Mr. Wells was able to harvest the same acreage at no direct cost since his cooperative farming agreement's special conditions were $650.00 more extensive. This year's special conditions cut-back necessitated the issuance of the special use permit.

Another cooperative farmer, Mr. West, harvested two acres of pasture hay from Field #308 as a portion of his refuge farming agreement.

C. Fur Harvest.

None on the acquired portions of the Refuge. Five trappers are known to have trapped for muskrat and otter on private sectors of the marsh within the proposed acquisition boundary of the Refuge.

D. Timber Removal. None

E. Commercial Fishing. None

F. Other Uses. None

V. FIELD INVESTIGATIONS OR APPLIED RESEARCH

A. Banding Programs.

Mourning Doves. A pre-season, concerted effort by Bureau and State personnel to band Refuge-located doves produced a total of 75 banded individuals. The Delaware Division of Fish and Wildlife (NARECO) set several mist-nests within a historic roosting area near Prime Hook Beach (Tract 39a); some four-hundred doves were observed flocking to this area nightly. Netting results "netted" two birds. It was surmised that the nets had been placed too conspicuously; a brush-cutter was employed in clearing narrow pathways through the thick understory of the roost . . . making for camouflagued netting lanes . . . still no results.

In the interim, Refuge personnel and Mr. Joseph Collins, a Management and Enforcement Biological Technician, trapped the more conventional way -- with wire-meshed, walk-in traps and banded 73 birds in Unit III and IV.

Ducks. Trapping began August 1 and terminated October 15. A single, walk-in, chicken-wire meshed, angle-iron framed, 9' x 8' x 5', trap captured the following:

Species	Male		Female		Total
	HY	AHY	HY	AHY	
Black	53	9	86	33	181
Mallard	23	2	21	3	49
Blue-winged Teal	-	1	-	-	1
Green-winged Teal	1	1	-	-	2
Pintail	1	-	2	-	3
Total					236

The August-September drought impeded the trapping results by lowering the trapsite's pond level to the extent that the dabblers could not enter the funnel trap.

B. Research.

On September 10, Daniel Mills, a Cornell University Cooperative Research Unit graduate student/teacher, collected several sediment/water samples from four stagnant freshwater pools in Unit IV. The cooperative research unit is assaying such samples, from various refuges within Region 5, for the presence of a strain of Clostridium botulinum. In an October 1 follow-up letter, Mr. Mills said, ". . . we will notify you including

information regarding the assay techniques and incidence of botulinum in all samples assayed." No further response has been made to date.

VI. PUBLIC REIA TIONS

A. Recreation.

The following statistics portray the annual recreational use:

1. Consumptive public use:

Activity	Use-Days
Hunting:	
Big Game	470
Upland Game	730
Waterfowl	1,472
Bow	60
Fishing:	
Salt Water	1,920
Warm Water	945
Sub-total	5,997

2. Non-consumptive public use:

Activity	Use-Days
Fox Chase	300
Wildlife Photography	60
Wildlife Observation	1,870
Wildlife Tours/Routes	520
Visitor Contact Stations	2,356
Picnicking (Wildlife Related)	580
Off-site Programs	146
Miscellaneous Wildlife	445
Boating	80
Horseback Riding	15
Bicycling	45
Winter Sports (Skating)	35
Fruit, Nut and Vegetation Collecting	35
Sub-total	6,488

The aforementioned statistics should not be construed as being pure-and-simple, factual data. There are several innate fallacies in the above listing technique:

1. It would seem logical to add the two sub-totals to derive the total recreational use figure -- not so: there is much overlapping between the two major sub-headings, but for lack of a more equitable system-- this breakdown will suffice.

2. One multi-purpose visit would further distort the "actual visit" number, i.e. it is conceivable for a person, on a single visit, to observe wildlife, photograph wildlife, picnic, fish, etc.

3. The category figures in which true credence may be had is the "Waterfowl" and "Off-site Program" figures; for those particular categories actual "head counts" were tallied, whereas, some of the others are somewhat nebulous, i.e. who's to say that a passing motorist was specifically on the Refuge for "Wildlife Observation" or to look for a likely photographic subject. . . or whatever?

4. The aforementioned sub-total figures actually belie the true public-use pattern of the Refuge. "Consumptive use" is much higher than its antithesis.

A more realistic annual "Actual Visit" figure approximates 8,237, as determined with the above criticisms considered.

B. Refuge Visitors.

Date	Name	Organization	Purpose
2/20	Kenneth Bessinger David Hugg John C. Williams	Delaware State Planning Office	State/Refuge Planning
5/21-5/22	Reg. Refuge Supvr. & Mrs. T. C. Horn	Regional Office Boston, Mass.	Inspection
5/26-27, 9/15-16	Asst. Reg. Supvr. Donald Brederntiz	Realty, Regional Office, Boston	Condemnation
5/26-27, 6/11	Chief Appraiser Joseph Senter	Army Corps of Engr. Wilmington, Del.	Condemnation
6/11	Bernard Melter	U.S. Justice Dept.	Condemnation
7/22	Jack Schuh	State Highway Dept.	Right-of-way Easement
9/10	Daniel Mills	Cornell Univ. Coop. Research Unit	Botulism Research
10/21	Richard Goerger	State Dept. of Agric.	Johnsongrass Control
11/5	Donald Campbell Henry Munay	U.S.D.A. - A.S.C.S.	Agricultural Practices
11/11	George E. Gage	Ref. Mgr. Target Rock N. W. R.	Courtesy
12/11	T. H. Simpson	State Highway Dept.	Ditch Drainage
12/16, 12/21	Horace Smith	State Highway Dept.	Ditch Drainage
12/21	Hoyt Hitchens	State Highway Dept.	Ditch Drainage

The Refuge was also visited on numerous occasions by: U.S. Game Management Agents Halstead and Kirkland, State Environmental

Protection Agents, Cooperative farmers and State Conservation Officers.

C. Refuge Participation.

The Assistant Manager has served as a Committee Member, Assistant Scoutmaster, and Merit Badge Counselor for Troop 198, Milton, Delaware, regularly attending weekly/monthly meetings.

The major items of Refuge participation were:

January 27-28	Manager Gage attended the 1970 Northeast Wildlife Conference, Wilmington, Delaware.
March 20	Managers Nelson and Gage met with the Delaware's Division of Fish and Wildlife (NARECO) personnel to discuss a possible land exchange (Federal vs. State), Dover, Delaware.
April 22	Manager Gage participated in "Earth Day" activities at the Georgetown Technical and Community College; presented a 15-minute lecture to 45 individuals.
May 23	Manager Gage met with the State's Department of Highway and Transportation representatives regarding right-of-way blasting permit as related to an adjacent Refuge landowner's drainage problem.
June 15	Manager Nugent attended the Delaware Wildlife Federation meeting, Little Creek, Delaware.
June 27	Biologist Holgersen gave a Refuge tour to 18 members of the Natural History Society of Delaware.
July 10	Manager Nugent attended a seminar at the Delaware Division of Fish and Wildlife (NARECO), regarding the State's Wetlands Evaluation Program.
July 22	Managers Nelson and Nugent met with State Department of Highway and Transportation personnel, regarding a 15-foot, right-of-way, easement on Tract #71.
August 22	Manager Nugent met with State Fish and Wildlife Division (NARECO) personnel, regarding Refuge dove banding activities and the Federally-sponsored, State-supervised, "Special Pheasant Hunt" program.

September 14	Manager Nugent met with a State Health Department Official regarding the pollution of the northernmost section of the Prime Hook Creek by an adjoining landowner.
October 29	Manager Nugent taped a radio interview, via telephone, with the General Manager of the Milford-based radio station WTHD. Contents of interview centered around the Refuges 1970-71 Waterfowl Hunting Season.
December 14	Manager Nugent attended the Milton Lions Club as a guest of member, Mr. Howard West (Cooperative Farmer).
December 15	Manager Nugent attended a seminar on Johnsongrass control at the University of Delaware's Agriculture, Georgetown sub-station; while in attendance, Manager Nugent was interviewed (via tape recorder) by the General Manager of the Milford-based radio station WTHD, regarding the Refuge's Johnsongrass problem.
December 20	Manager Nugent, organized and conducted an all-day field trip for Milton's Boy Scout Troop 198; the agenda included a tour of the Bombay Hook National Wildlife Refuge and a lecture/guided-tour/movie presentation at the Brandywine Nature Center, Greenville, Delaware.

D. Hunting.

1. Waterfowl. For the fourth consecutive year the Refuge and Delaware's Division of Fish and Wildlife coordinated their efforts in presenting a single public waterfowl hunting program on their respective contiguous areas (see maps). A part-time laborer was hired to man the Waterfowl Check Station during the peak-use periods: from 2½ hours before sunrise until ½ hour thereafter. His duties included the issuance of the permits, witnessing the permit-holder's signing of the register, and to inform the uninitiated hunter as to the rules and regulations governing the Federal and State hunting program.

   As in previous years, the State personnel assisted with the regrassing and refurbishing of the twenty-six water blinds; accessibility was made possible by the Refuge operation of the Division of Management and Enforcement's airboat.

Issuance of permits is on a first-come first-served basis. The hunter has learned during the last few years that to be assured a blind on opening day, he must arrive early. The first and second year hunters' appeared at the check station the evening before the opening day; the third year, the first would-be hunter arrived twenty-six hours in advance; this year two hunting companions pulled-up to the Station with a camper in tow, forty-five hours ahead of the permit-issuance hour! To control the early demand the hunters initiated a sign-up sheet where a person from each hunting party must sign and remain on the premises during the interim. Periodic roll-calls are made by the hunters to assure the rule's compliance. If a pre-registerant does not answer to his name, his list position is dropped and all subsequent signers move up one notch on the list. Even after the maximum number of twenty-six blinds are signed out, many others will sign up hoping that fate may have them qualify at the expense of someone else. It has been the policy of the Refuge to recognize the hunters self-imposed rules and regulations and if the majority of the hunters are in accord with the sign-up sheet, that is how the permits are issued. Subsequent to opening day the hunting pressure quickly subsides, excepting Saturdays and holidays.

Hunting results for the 1970-71 Waterfowl Hunting Season excelled all previous years. A split waterfowl hunting season prevailed this year: first half: Ducks and Canada Geese - October 31 - November 28, 1970; second half: Ducks - December 12, 1970 - January 1, 1971 and Canada geese - December 12, 1970 - January 21, 1971.

The duck season ran its scheduled duration but the goose season was prematurely terminated on the Refuge on January 7, 1971 due to icing conditions.

Following are comparative facts and figures pertaining to the Refuge waterfowl hunting program:

Hunting Years	Total No. Hunter Days	Ducks Bagged				Geese Bagged	Total Bag
		G.W. Teal	Black	Mallard	Misc. Ducks		
1967-68	803	139	50	44	98	11	342
1968-69	1,167	230	120	57	55	87	531
1969-70	1,105	250	122	73	153	39	637
1970-71	1,472	287	133	89	122	209	840

This year a tally was kept on the hunting success from each individual blind as based on total hunter usage. Blind usage varied, due to past hunting success and accessibility, from 16 man-days for Blind 27 to 102 for Blind 14. Average bag was .57 birds

(ducks and geese); extreme bags, as based on individual blinds, varied from .23 birds (Blind #8) to 1.48 (Blind #28).

A final potpourri, as related to this year's hunting results, finds that one out of fifteen blinds had a retriever present; a scant 4.3% of the permit-holders failed to return their permit questionnaires . . . if an individual's name showed up twice via a cross-reference check with the register as not having returned his permit he was notified and asked for an explanation; each blind accommodated an average hunting party of two men, even though the limit is three; and a marked decrease in hunting results was noted after opening day -- as especially evidenced in the goose kill, the first three days accounted for 62% of the season's total kill.

2. Big Game.

Total Refuge hunting pressure by archer and shotgun hunter for the whitetail was approximately 470 deer-hunter days. An estimated dozen deer were bagged, the exact figure not being known due to the fact the hunter does not check his kill with Refuge personnel.

Known extremes in age and weight of deer taken ranged from a field-dressed fawn weighing 35 lbs. to a trophy, 2½ year, twelve point buck weighing 169 lbs. field-dressed.

Sussex County's shotgun deer season lasted eight days.

3. Upland Game.

The second annual "Special Pheasant Hunt" was held on the Refuge from October 10 through October 17. The State-sponsored hunt was deemed a success by most participants. A total of one-hundred and thirteen cock pheasants were turned out on two separate release dates. The hunting pressure was 218 hunting days; the aggregate bag totalled 65 birds. Additional birds were removed during the regular upland game season but the exact figures are unknown.

A couple of safety precautions were instituted in this year's "Special Pheasant Hunt": (1) the total number of hunters allowed afield at any one time was restricted to seventy-five, and (2) hunting did not begin until 9:00 A.M., allowing for any early morning fog to dissipate.

Other game hunted on the Refuge were the Bobwhite quail, grey squirrel, cottontail rabbit, and red fox (chase only).

E. Violations.

Several cases were made within the acquisition area by Refuge personnel and U. S. Game Management Agents during 1969; final disposition occurred this calendar year. Results:

Defendant	Prosecution	Violation	Fine
John B. Wells	Federal Court	Baiting	$25.00
Robert L. Zook	Federal Court	Baiting	25.00
William Zook	Federal Court	Baiting	25.00
Carlton E. Argo	Federal Court	Baiting	32.50*
David I. King	State Court	Baiting	25.00
John D. Shockley**	State Court	Illegal Possession of waterfowl; loaded gun in vehicle.	72.50*

* - Fine includes court costs.
** - Apprehension made during this calendar year.

On opening day of the 1970-71 Waterfowl Hunting Season a near melee ensued as many novice Refuge hunters swarmed throughout the area. Their anticipation was great, but their commonsense was nil. Many individuals were ignorant of the fact that waterfowl hunting was only on a limited area and administered via a check station, as noted in a general news release. The ignoramuses went so far as to set up their own decoys within protected areas, within clear view of the headquarters. True, there were "Public Hunting Area" signs erected as applied to the upland game season but a notation at the bottom of each sign instructs the reader that the hunting is limited to Federal and State laws and to consult with the manager for current regulations.

Eleven apprehensions were made on opening day. Violations included taking and attempting to take waterfowl in a closed area to waterfowl hunting; driving of vehicles on undesignated areas; an unplugged gun; and illegal entry into the waterfowl hunting area via intentional circumvention of the check station rules and regulations.

The turmoil subsided after that initial fiasco and for the remainder of the season only one other individual was cited for waterfowl hunting in a closed area. Stenciled signs regarding "Waterfowl Hunting by Permit Only" were immediately erected to help rectify any past ambiguities.

Whether the above twelve individuals will be prosecuted is left to the discretion of the U. S. Commissioner. To date no word has been received.

Wanton destruction of Refuge property has been relatively minor as compared to previous years; it may be due in part to the State Polices' apprehension of several teenage hooligans who had been

ransacking and vandalizing private property along the Delaware Bay's southern shore development areas. None the less, some vandalism in the form of defacing and stealing Refuge signs has occurred along with the stealing of several six-foot long sections of concrete parking lintels.

F. Safety.

Monthly safety meetings were conducted throughout the year, either at Prime Hook or in coordination with Bombay Hook's safety meetings. The Refuge still has an unblemished Safety Record of 2,038 days without a lost-time accident.

Safety-related activities included:

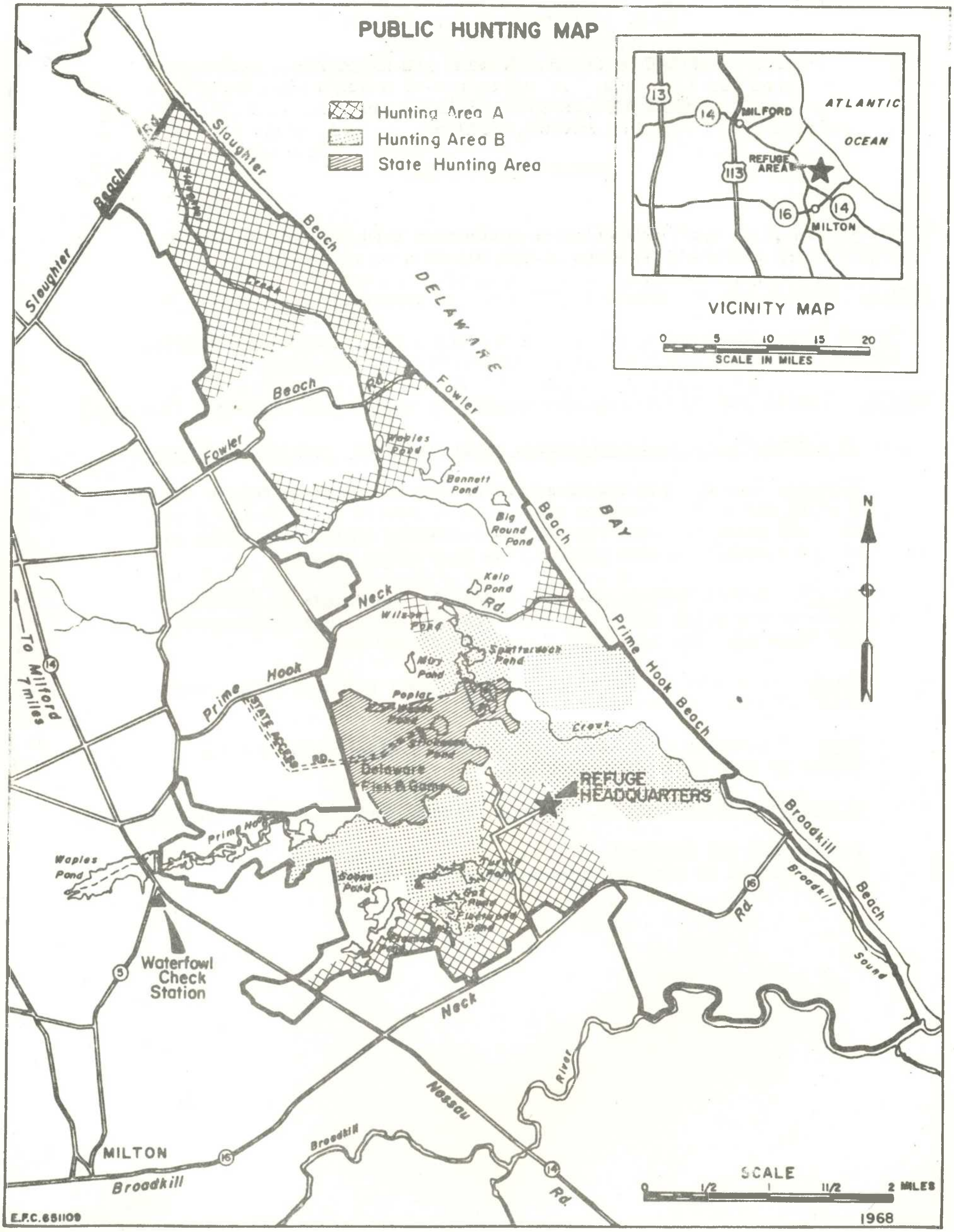
1. Boat flotation tests on the 12-foot and 14-foot Gruman boats,

2. Painting and stenciling of ten fire buckets,

3. Constructing two trash barrels and repainting another two,

4. Quarterly water quality tests, and

5. Installing two fire-protection cans at headquarters (one filled with sand, the other with water).


PUBLIC HUNTING MAP
Hunting Area A
Hunting Area B
State Hunting Area
VICINITY MAP
13
14
MILFORD
ATLANTIC
OCEAN
REFUGE AREA
113
16
14
MILTON
0 5 10 15 20
SCALE IN MILES
Slaughter Beach Rd.
Slaughter Beach
Creek
DELAWARE
BAY
Beach Rd.
Fowler Beach
Fowler
Beach
Bennett Pond
Big Round Pond
Kelp Pond
Neck Rd.
Wilson Pond
Prime Hook Beach
Prime Hook Rd.
STATE ACCESS RD.
Delaware Fish & Game
Creek
REFUGE HEADQUARTERS
Broadkill Beach
Broadkill Sound
16
Rd.
To Milford 7 miles
14
Waples Pond
Waterfowl Check Station
5
Neck
River
Nassau
MILTON
16
Broadkill
Broadkill
14
Rd.
N
SCALE
0 1/2 1 11/2 2 MILES
E.F.C. 651109
1968

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

PRIME HOOK NATIONAL WILDLIFE REFUGE
MILTON, DELAWARE

PUBLIC HUNTING AREAS

These areas will be open to hunting in accordance with Federal and State regulations and special conditions listed below.

AREA A. Permits are not required. (See map on reverse.)

Upland Game. The hunting of only white-tailed deer, cottontail rabbits, squirrel, raccoon, red fox, quail, and pheasant is permitted.

AREA B. Special permits are required except for upland game hunting. (See map.)

1. Waterfowl, coot, rail, gallinule, mourning dove, woodcock, and snipe.

   Permits. Issued from two hours before sunrise until 3:00 p.m. each hunting day at the checking station at intersection of Routes 5 and 14. All persons during the waterfowl hunting season must check out at the checking station prior to one hour after sunset.

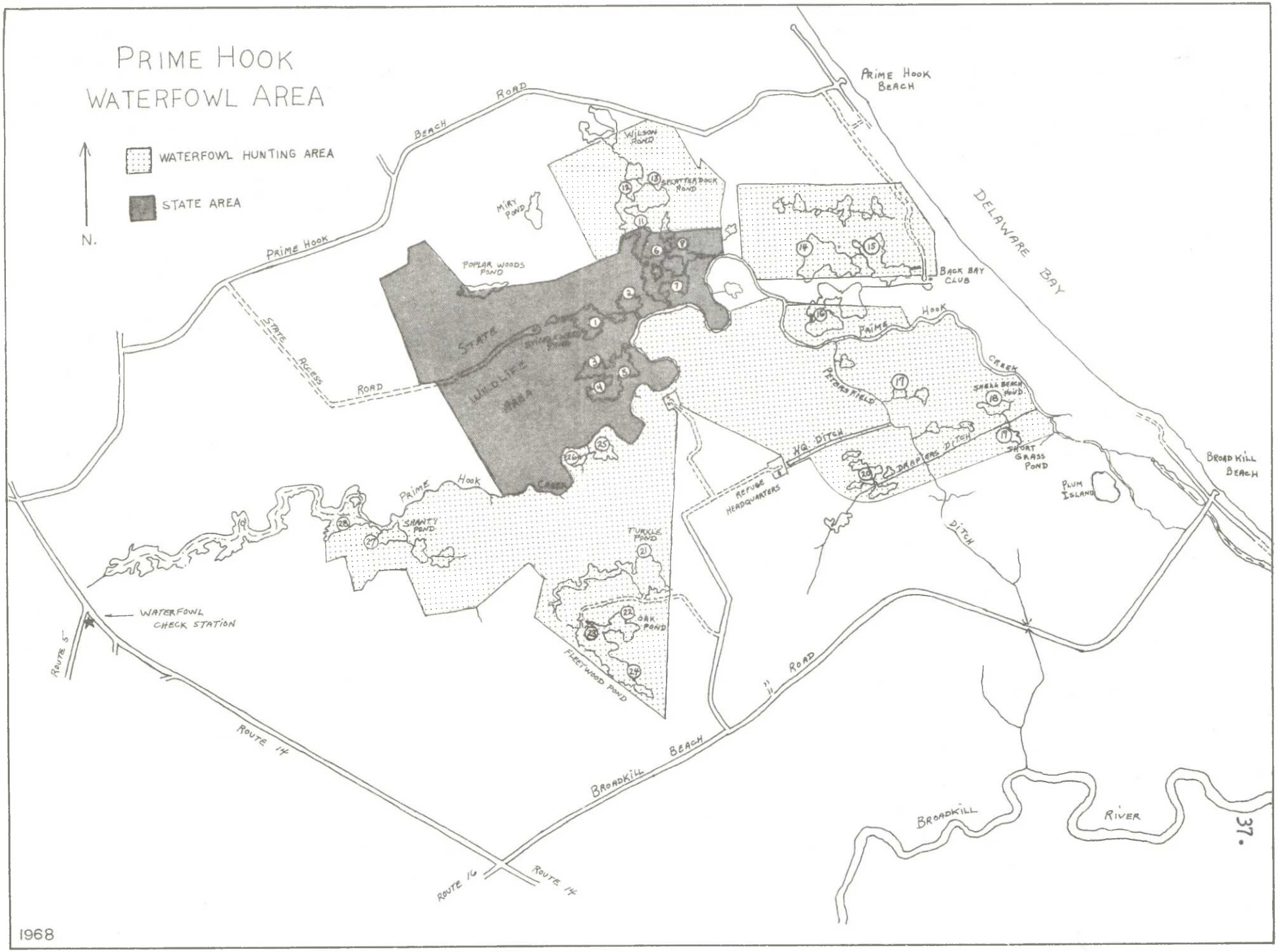
   Blinds. Permit holders may gain access to the blinds at (1) the State access point off Prime Hook Road, or (2) refuge headquarters off Route 16. Not more than three persons per blind.

   Boats. Necessary to reach all blinds. Small outboard motors and stout poles are recommended.

   Guns. Possession of a loaded gun outside a blind while hunting migratory game birds is prohibited.

2. Upland Game (deer, rabbit, squirrel, raccon, red fox, quail; and pheasant).

   Permits are not required.
   May be hunted on sections accessible by foot travel.


PRIME HOOK
WATERFOWL AREA
WATERFOWL HUNTING AREA
STATE AREA
N.
PRIME HOOK BEACH ROAD
PRIME HOOK BEACH
WILSON POND
SPATTERDOCK POND
MIRY POND
POPLAR WOODS POND
STATE WILDLIFE AREA
STATE ACCESS ROAD
PRIME HOOK
DELAWARE BAY
BACK BAY CLUB
PRIME HOOK CREEK
PETERS FIELD
SMALL BEACH POND
HQ. DITCH
DRAPERS DITCH
SHORT GRASS POND
REFUGE HEADQUARTERS
PLUM ISLAND
BROAD KILL BEACH
DITCH
SHANTY POND
TURKLE POND
OAK POND
FLEETWOOD POND
WATERFOWL CHECK STATION
ROUTE 5
ROUTE 14
BROADKILL BEACH ROAD
ROUTE 16
ROUTE 14
BROADKILL RIVER
1968

WATERFOWL HUNTING PERMIT

DATE _____ BLIND NUMBER _____

	HUNTER'S NAME	HUNTER'S LICENSE NO.
1.	_____	_____
2.	_____	_____
3.	_____	_____

NUMBER OF DOGS USED _____

PLEASE FILL OUT THE OTHER SIDE WHEN HUNT IS COMPLETED AND RETURN TO CHECKING STATION.

WATERFOWL BAG CHECK

PLEASE WRITE THE NAME AND NUMBER OF DUCKS AND GEESE YOUR PARTY KILLED AND CRIPPLED TODAY.

	NAME OF WATERFOWL	NO. KILLED	NO. CRIPPLED
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____

SPECIAL PHEASANT HUNTING PERMIT NUMBER .....
AREA Prime Hook **DATE .....**

This Permit MUST Be Kept In Possession When Hunting and **RETURNED** At The End Of Your Hunt.

REGULATIONS

Daily Limit - 1 Bird. Hunter must leave the field immediately after bagging a bird and return to check-out.
Shooting Hours - 9:00 A.M. - 5:00 P.M. E.D.T.
Permit Required - Areas posted for Special Season Permits only issued to a predetermined safe number of hunters.
Permits issued on day of hunt.
Permit good only for day of issuance. As successful hunters check-out, additional permits will be issued.

PLEASE ANSWER QUESTIONAIRE ON THE BACK OF THIS PERMIT!

So That We May Evaluate Our Management Work On This Area, Please Answer the Following Questions:

Did you kill a Pheasant? .....
Number of hunters in your party? .....
Number of dogs used in your party? .....
Time you started hunting? .....
Time you finished hunting? .....
Number of shots fired? .....
Number of birds crippled? .....
Your comments on how this season could be improved:

Thank You For Your Cooperation
Division of Fish and Wildlife
Dover, Delaware

VII. OTHER ITEMS

A. Items of Interest.

1. Personnel Notes.

Assistant Refuge Manager George E. Gage transferred on June 4, 1970 to the Target Rock National Wildlife Refuge as Refuge Manager, after having served the Refuge well for nearly three years.

Assistant Refuge Manager Richard F. Nugent entered on duty on June 15, 1970, being transferred from the Bombay Hook National Wildlife Refuge.

2. Training.

Both past and present Assistant Refuge Managers attended and successfully completed an "Interpreting the Natural Environment" course which was offered at the Delaware State College, Dover, Delaware. Inclusive dates of attendance were from February 5 to May 26, 1970.

Manager Gage attended the 1970 "Wing-Bee" at the Patuxent Wildlife Research Center from February 2-6, 1970.

Manager Nugent attended the "Systems Approach to Refuge Management Workshop" at the Boston Regional Office on August 27 and 28, 1970.

3. Awards.

A fifty dollar award was presented to Assistant Refuge Manager Nugent for his part in the joint effort with former Assistant Manager Gage for planning, designing, coordinating and erecting a trail blazer sign as constructed by the Sign Shop of the Delaware Department of Highways and Transportation.

4. Revenue Sharing Act.

Manager Nelson presented the Sussex County Levy Court a Refuge Revenue Sharing Act check in the amount of $9,758.58 on December 29, 1970.

5. Credits.

Wildlife Biologist Norman E. Holgersen prepared Sections II.A.1 and 3, II.E., II.F., Tables 2 through 5, and NR forms 1 through 4 and 12. Assistant Refuge Manager Richard F. Nugent prepared the remainder of the text and NR forms and

assembled the report. Refuge Manager Robert G. Nelson edited the entire report. Refuge Clerk Virginia E. Baughman and Clerk-Steno. Joan C. MacDonald typed the report in its entirety.

B. Narrative Report Forms. Appended.

C. News Articles. Appended.

D. Photographs. Appended.

Reviewed by: _____

Date: 2/9/71

Submitted by: Robert G. Nelson

Date: 2/5/71

NR's Checked in R.O. by _____

3-1750
Form NR-1
(Rev. Mar... 1953)

WATERFOWL

REFUGE Prime Hook MONTHS OF January TO April , 1970

(1) Species	January 1 - 7 Aerial	8 - 14 2	15 - 21 3	22 - 28 4	February 29 - 4 5	5 - 11 6	12 - 18 7	19 - 25 8	March 26 - 4 9	5 - 11 10
	Weeks of reporting period									
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	3,000	2,000	800	900	1,600	1,800	3,200	3,600	3,600	4,500
Cackling										
Brant										
White-fronted										
Snow	10	-	5	-	-	-	-	5	5	10
Blue										
Other										
Ducks:										
Mallard	425	25	25	25	40	50	400	1,000	1,000	500
Black	650	75	75	75	175	200	1,000	1,500	1,500	1,000
Gadwall	20					10		25	25	75
Baldpate	35						100	50	50	200
Pintail	550				100	400	3,000	3,500	3,500	2,000
Green-winged Teal	225					5	30	200	200	500
Blue-winged Teal										
Cinnamon Teal										
Shoveler	10							5	5	50
Wood										
Redhead										
Ring-necked										
Canvasback								5	5	
Scaup								30	30	
Goldeneye	15									10
Bufflehead	10	5	5	5	-	-	20	30	30	
Ruddy										
Other Hooded merg.										25
Red-breasted merg.										15
Coot:	20	10	-	-	-	-	-	-	-	-

SRF 11/2/66

3-1750a
Cont. NR-1
(Rev. March 1953)
5RF - 4/68

WATERFOWL
(Continuation Sheet)

REFUGE Prime Hook MONTHS OF January TO April , 1970

(1) Species	March 12 - 18 (11)	March 19 - 25 Aerial	March 26 - April 1 (13)	April 2 - 8 (14)	April 9 - 15 (15)	April 16 - 22 (16)	April 23 - 29 (17)	April 30 (18)	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated Total
Swans.											
Whistling											
Trumpeter											
Geese:											
Canada	6,000	2,000	2,000	1,100	700	700	300	300	264,900		
Cackling											
Brant											
White-fronted											
Snow	15	15			45	45	-	-	1,085		
Blue		5							35		
Other											
Ducks:											
Mallard	300	100	50	25	25	25	25	25	28,305		
Black	600	400	250	150	150	150	150	150	56,850		
Gadwall	75	75	50	50	50	50	50	50	3,935		
Baldpate	225	200	100	25	150	150	100	100	9,795		
Pintail	1,000	750	25	10	50	50	25	25	104,745		
GW teal	500	500	1,200	300	1,000	1,000	500	500	43,620		
BW teal	10	150	150	150	400	400	300	300	11,220		
Cinnamon teal											
Shoveler	50	50	100	100	75	75	50	50	4,040		
Wood	25	50	50	50	50	50	50	50	2,325		
Redhead											
Ring-necked	15	15							210		
Canvasback	5								105		
Scaup	30								630		
Goldeneye									175		
Bufflehead	10	10	5	5					945		
Ruddy											
Other Hooded merg.									175		
Red-breasted merg.	5	5	5	5					245		
Coot:				10	10	10	10	10	500		

(over)

NR-1 Cont. From ____ to ____ 19____

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	266,020	6,015	
Ducks	267,320	6,345	
Coots	500	20	

SUMMARY

Principal feeding areas Units 2 and 4

Principal nesting areas

Reported by Norman E. Holgerson

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

(1) Species: In addition to the birds listed on form, other species occurring on the refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

3-1750
Form NR
(Rev. March 1953)

WATERFOWL

REFUGE Prime Hook MONTHS OF May TO August, 1970

(1) Species	May 1-7 (1)	8-14 (2)	15-21 (3)	22-28 (4)	June 29-4 (5)	5-11 (6)	12-18 (7)	19-25 (8)	July 26-2 (9)	3-9 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada	120									
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other										
Ducks:										
Mallard	25	25	25	25	50	50	50	50	75	75
Black	150	150	150	150	175	250	250	250	250	250
Gadwall	25	25	25	25	25	25	50	50	75	75
Baldpate										
Pintail	5									
Green-winged teal	100	25	25	25						
Blue-winged teal	300	200	200	200	250	300	350	350	350	350
Cinnamon teal										
Shoveler	25									
Wood	50	50	50	50	100	100	100	100	150	150
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										
Coot	10	10	10	10						

3-1750a
Cont. NR-1
(Rev. March 1953)
5RF - 4/68

WATERFOWL
(Continuation Sheet)

REFUGE Prime Hook MONTHS OF May TO August, 19 70

(1) Species	July 10-16 (11)	17-23 (12)	24-30 (13)	August 31-6 (14)	7-13 (15)	14-20 (16)	21-27 (17)	28-31 (18)	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated Total
Swans.											
Whistling											
Trumpeter											
Geese:											
Canada									840		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
Other											
Ducks:											
Mallard	75	75	75	75	50	50	50	50	6,500	2	50
Black	250	250	250	250	200	200	200	200	26,175	2	150
Gadwall	75	75	75	75	50	50	50	50	6,150	2	50
Baldpate											
Pintail			5	5	5	5	5	5	230		
GW teal						50	150	150	3,225		
BW teal	350	350	350	300	250	200	200	200	34,750	5	200
Cinnamon teal											
Shoveler									175		
Wood	150	150	200	200	200	200	200	200	16,200	0	50
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:									280		

(over)

NR-1 Cont. From ____ to ____ 19____

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	840		
Geese	840	120	
Ducks	93,405	955	
Coots	280	10	

SUMMARY

Principal feeding areas: Units 2, 3 and 4

Principal nesting areas: Units 2,3 and 4

Reported by: N. Holgersen.

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

(1) Species: In addition to the birds listed on form, other species occurring on the refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

3-1750
Form NR
(Rev. March 1953)

WATERFOWL

REFUGE Prime Hook MONTHS OF September TO December, 1970

(1) Species	(2) October Weeks of reporting period: Sept. 1 - 7 (1)	8 - 14 (2)	15 - 21 (3)	22 - 28 (4)	29 - 5 (5)	6 - 12 (6)	13 - 19 (7)	20 - 26 (8)	Nov. 27 - 2 Aerial (9)	3 - 9 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada				75	50	100	15,000	25,000	26,500	10,000
Cackling										
Brant										
White-fronted										
Snow							5	10	50	125
Blue										
Other										
Ducks:										
Mallard	50	50	50	25	25	25	25	55	55	50
Black	200	200	200	250	250	300	300	450	450	400
Gadwall	50	50	25	25						
Baldpate									15	10
Pintail	5	5						150	150	50
Green-winged teal	150	150	150	150	150	150	150	900	900	1,200
Blue-winged teal	200	200	200	100	100	50	50	25		
Cinnamon teal										
Shoveler				5					10	
Wood	200	200	200	200	200	225	225	225	225	100
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										

3-1750a
Cont. NR-_
(Rev. March 1953)
5RF - 4/68

WATERFOWL
(Continuation Sheet)

REFUGE Prime Hook MONTHS OF September TO December, 19 70

(1) Species	Nov. 10 - 16 (11)	Nov. 17-23 (12)	Nov. 24-30 (13)	Dec. 1-7 (14)	Dec. 8-14 (15)	Dec. 15-21 (16)	Dec. 22-28 (17)	Dec. 29-31 (18)	(3) Estimated waterfowl days use	(4) Production Broods seen	(4) Production Estimated Total
(2) Weeks of reporting period											
Swans.											
Whistling											
Trumpeter											
Geese:											
Canada	6,000	6,000	3,000	2,000	3,500	2,500	2,500	2,500	723,075		
Cackling											
Brant											
White-fronted											
Snow	20	20	25	30	10	60			2,485		
Blue											
Other											
Ducks:											
Mallard	50	100	100	100	100	100	100	100	7,720		
Black	400	375	375	375	350	300	300	300	39,225		
Gadwall									1,050		
Baldpate	10	10	10	10	10				525		
Pintail	50	30	30	30	50	50	50	10	4,580		
GW teal	1,000	1,000	300	200	50	50	50	25	46,975		
BW teal									6,475		
Cinnamon teal											
Shoveler				5					110		
Wood	50	50							14,700		
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:											

(over)

NR-1 Cont. From _____ to _____ 19____

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	725,560	26,550	
Ducks	121,390	1,810	
Coots			

SUMMARY

Principal feeding areas: Units 2, 3 and 4.

Principal nesting areas:

Reported by: Norman E. Holgersen

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

(1) Species: In addition to the birds listed on form, other species occurring on the refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

3-1751
Form 1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge **Prime Hook** Months of **January** to **April** 19**70**

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Pied-billed Grebe	Previous	Period	25	3/15-4/30	Still	Present				1,200
Great Blue Heron	Previous	Period	15	3/15-31	Still	Present				700
Green Heron	15	4/24	15	4/24-30	Still	Present				105
Cattle Egret	6	4/24	6	4/24	6	4/24				6
Common Egret	1	1/12	3	2/15-30	Still	Present				60
Snowy Egret	6	4/16	12	4/21-25	Still	Present				100
Louisiana Heron	3	4/08	8	4/20	Still	Present				100
Black-crowned night Heron	Previous	Period	10	3/25-4/30	Still	Present				400
American Bittern	Previous	Period	75	4/15-30	Still	Present				1,500
Glossy Ibis	6	3/23	55	4/08	Still	Present				200
Clapper Rail	Previous	Period	200	4/1-30	Still	Present				6,500
Common Gallinule	2	4/15	2	4/15-30	Still	Present				32
II. Shorebirds, Gulls and Terns:										
Killdeer	Previous	Period	50	3/29-4/4	Still	Present				800
Ruddy Turnstone	Previous	Period	60	4/15	Still	Present				150
American Woodcock	Previous	Period	150	3/15-21	Still	Present				4,500
Common Snipe	Previous	Period	300	3/15-21	Still	Present				7,000
Spotted Sandpiper	1	4/29	1	4/29-30	Still	Present				2
Pedtoral Sandpiper	17	4/08	17	4/08	17	4/08				17
Least Sandpiper	3	4/29	3	4/29-30	Still	Present				6
Willet	5	4/15	75	4/20-30	Still	Present				1,000
Greater Yellowlegs	3	3/18	30	3/21-31	Still	Present				350
Lesser Yellowlegs	1	4/08	5	4/24-30	Still	Present				50
Dunlin	Previous	Period	10	4/1-30	Still	Present				350
Sanderling	Previous	Period	10	4/1-30	Still	Present				350
Great Black-backed Gull	Previous	Period	50	1/1-3/1	Still	Present				5,000

(over)

(1)	(2)		(3)		(4)		(5)			(6)
III. Doves and Pigeons:										
Mourning dove	Previous	Period	200	3/1-4/30	Still	Present				15,000
White-winged dove										
IV. Predaceous Birds:										
Golden eagle										
Duck hawk	Previous	Period	30	3/1-4/30	Still	Present				3,000
Horned owl										
Magpie										
Raven	Previous	Period	25	3/1-4/30	Still	Present				2,500
Crow, fish	2	2/25	25	3/1-4/30	Still	Present				1,500
Red-tailed Hawk	Previous	Period	20	1/1-2/15	Still	Present				1,100
Red-shouldered Hawk	Previous	Period	5	1/1-2/15	Still	Present				400
Rough-legged Hawk	Previous	Period	5	1/1-30	1	4/19				175
Marsh Hawk	Previous	Period	35	1/1-2/15	Still	Present				2,000
Sparrow Hawk	Previous	Period	25	1/1-31	Still	Present				2,000
Osprey	2	3/17	4	3/29-4/30	Still	Present				140

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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Explanation of column headings:

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(2)	First Seen:	The first migration record for the species for the reporting period.
(3)	Peak Numbers:	Estimated number and inclusive dates when peak population of the species occurred.
(4)	Last Seen:	The last refuge record for the species during the season concerned.
(5)	Production:	Estimated number of young produced based on observations and actual counts.
(6)	Total:	Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1771
Form . -1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Prime Hook Months of January to April 19 70

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
II. Shorebirds, Gulls and Terns:										
Herring Gull	Previous	Period	300	1/1-3/1	Still	Present				30,000
Ring-billed Gull	Previous	Period	50	4/1-30	Still	Present				2,000
Laughing Gull	30	4/5	100	4/7-30	Still	Present				2,300

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove					
White-winged dove					
IV. Predaceous Birds:					
Golden eagle					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow					
Barn Owl	Previous Period	8	1/1-3/1	Still Present	750
Screech Owl	Previous Period	15	1/1-3/1	Still Present	1,000
Barred Owl	Previous Period	10	1/1-4/30	Still Present	1,200
Short-eared Owl	Previous Period	10	1/15-3/1	2 3/15	700

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(2) First Seen: The first migration record for the species for the reporting period.
(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1751
Form 1. 1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Prime Hook Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Pied-billed Grebe	Previous	Period	15	6/1-8/31	Still	Present				1,700
Great Blue Heron	Previous	Period	25	7/1-8/31	Still	Present				2,400
Green Heron	Previous	Period	100	7/15-8/31	Still	Present				8,000
Cattle Egret	10	5/1	225	8/1-21	Still	Present				9,000
Common Egret	Previous	Period	5	7/28-8/31	Still	Present				250
Snowy Egret	Previous	Period	50	8/14-21	Still	Present				1,000
Louisiana Heron	Previous	Period	1	7/28	1	7/28				1
Black-crowned Night Heron	Previous	Period	25	8/15-31	Still	Present				600
Least Bittern	5	5/5	100	6/1-7/31	Still	Present				8,000
American Bittern	Previous	Period	25	6/1-7/31	Still	Present				2,500
Glossy Ibis	Previous	Period	25	8/1-21	Still	Present				800
White Ibis	1	8/3	1	8/3, 8/20	1	8/20				2
King Rail	10	5/1	50	7/1-8/31	Still	Present				4,000
Clapper Rail	Previous	Period	200	7/1-8/31	Still	Present				20,000
Virginia Rail	10	5/1	100	7/1-8/31	Still	Present				10,000
Sora	1	7/14	1	7/14	1	7/14				1
Common Gallinule	Previous	Period	20	8/1-31	Still	Present				1,000
II. Shorebirds, Gulls and Terns:										
Semipalmated Plover	5	8/3	75	8/14-21	Still	Present				1,500
Killdeer	Previous	Period	25	7/15-8/15	Still	Present				2,500
American Golden Plover	5	8/19	5	8/19	5	8/19				5
Black-bellied Plover	1	8/3	25	8/21-31	Still	Present				400
Ruddy Turnstone	Previous	Period	15	8/21-31	Still	Present				200
American Woodcock	Previous	Period	100	6/1-7/31	Still	Present				9,000
Common Snipe	Previous	Period	50	8/21-31	Still	Present				500
Upland Plover	3	8/5	3	8/5, 8/21	3	8/21				6
Spotted Sandpiper	Previous	Period	25	7/15-8/15	Still	Present				2,000
Willet	Previous	Period	200	8/15-7/15	5	8/5				13,000
Greater Yellowlegs	Previous	Period	55	8/21-31	Still	Present				800
Lesser Yellowlegs	Previous	Period	40	8/14-31	Still	Present				1,000
Pectoral Sandpiper	2	7/28	10	8/14-31	Still	Present				200

(over)

(1)	(2)	(3)		(4)	(5)		(6)
III. Doves and Pigeons:							
Mourning dove	Previous Period	350	7/15-8/31	Still Present			30,000
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl	Previous Period	20	5/1-8/31	Still Present			2,400
Magpie							
Raven							
Crows common	Previous Period	50	7/1-8/31	Still Present			5,000
Crow, fish	Previous Period	25	8/1-31	Still Present			1,400
Red-tailed Hawk	Previous Period	10	6/1-8/31	Still Present			1,200
Red-shouldered Hawk	Previous Period	5	6/1-8/31	Still Present			600
Marsh Hawk	Previous Period	5	8/1-31	Still Present			350
Osprey	Previous Period	6	5/1-7/31	[illegible]3 8/18	1	0	600
Sparrow Hawk	Previous Period	12	6/1-8/31	Still Present			1,200
Barn Owl	Previous Period	6	6/1-8/31	Still Present			600

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(2) First Seen: The first migration record for the species for the reporting period.
(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1751
Form 1 1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Prime Hook Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
~~xxxx~~ [redacted] Birds:										
II. Shorebirds, Gulls and Terns:										
Least Sandpiper	Previous	Period	25	8/14-21	Still	Present				500
Dowitcher	35	7/14	75	8/1-21	Still	Present				2,000
Stilt Sandpiper	2	8/3	55	8/19	Still	Present				100
Semipalmated Sandpiper	10	7/14	350	8/14-21	Still	Present				3,500
Western Sandpiper	1	8/3	5	8/14-31	Still	Present				100
Sanderling	Previous	Period	10	8/1-31	Still	Present				350
Great Black-backed Gull	Previous	Period	10	8/21-31	Still	Present				150
Herring Gull	Previous	Period	50	7/15-8/31	Still	Present				4,000
Ring-billed Gull	Previous	Period	5	7/15-8/31	Still	Present				350
Laughing Gull	Previous	Period	150	8/21-31	Still	Present				2,500
Forster's Tern	5	7/1	15	7/15-8/31	Still	Present				900
Least Tern	5	7/14	10	8/1-31	Still	Present				400
Caspian Tern	2	8/19	2	8/19	2	8/19				2
~~III. xxxx~~ [redacted] Terns:										
Black Skimmer	19	8/19	19	8/19	19	8/19				19

(over)

NR-1A From ______ to ______ 5RF-8/69

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove					
White-winged dove					
IV. Predaceous Birds:					
Golden eagle					
Duck hawk					
Horned owl					
Magpie					
Raven					
Crow					
Screech Owl	Previous Period	8	6/1-8/31	Still Present	800
Barred Owl	Previous Period	10	6/1-8/31	Still Present	1,000

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-177
Form 1. 1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge **Prime Hook** Months of **September** to **December** 19**70**

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Pied-billed Grebe	Present Period		25	9/1-10/31	Still Present					2,000
Great Blue Heron	Present Period		25	9/1-11/15	Still Present					2,500
Green Heron	Present Period		100	9/1-30	1	10/15				3,100
Cattle Egret	Present Period		75	9/1-15	1	11/23				1,300
Common Egret	Present Period		5	9/1-15	1	10/15				200
Snowy Egret	Present Period		250	9/10-15	1	10/31				2,500
Louisiana Heron	1	9/1	1	9/1	1	9/1				1
Black-crowned night Heron	Present Period		25	9/1-30	Still Present					1,100
Least Bittern	Present Period		50	9/1-15	5	10/15				1,000
American Bittern	Present Period		50	9/1-15	Still Present					1,500
Glossy Ibis	Present Period		10	9/14	3	10/30				100
King Rail	Present Period		100	9/15-10/15	Still Present					5,000
Clapper Rail	Present Period		250	9/15-10/15	Still Present					12,000
Virginia Rail	Present Period		150	9/15-10/15	Still Present					7,500
Sora	50	9/7	100	9/15-10/15	10	10/15				5,000
Common Gallinule	Present Period		25	9/1-15	5	10/15				400
II. Shorebirds, Gulls and Terns:										
Semipalmated Plover	Present Period		50	9/1-7	5	10/15				500
Killdeer	Present Period		50	9/7-21	Still Present					3,000
American Golden Plover	7	9/1	18	9/16	3	11/5				225
Black-bellied Plover	Present Period		90	11/1-10	Still Present					4,000
Ruddy Turnstone	Present Period		50	11/5-10	Still Present					1,800
American Woodcock	Present Period		250	11/5-11	Still Present					6,000
Common Snipe	Present Period		300	9/15-11/1	Still Present					11,000
Spotted Sandpiper	Present Period		10	9/1-15	1	9/20				150
Greater Yellowlegs	Present Period		110	9/15-30	1	11/23				3,500
Lesser Yellowlegs	Present Period		30	9/1-15	1	11/5				1,000
Knot	7	9/1	7	9/1	7	9/1				7
Pectoral Sandpiper	Present Period		15	9/1-15	1	11/5				600
White-rumped Sandpiper	1	9/1	2	9/14	2	9/14				5

(over)

NR-1A From_____ to_____

5RF-8/69

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove White-winged dove	Present Period	800 10/15-31	Still Present		28,000
IV. Predaceous Birds:					
Golden eagle					
Great Duck hawk Horned owl Magpie	Present Period	30 9/1-12/31	Still Present		3,600
Raven					
Crow, Common	Present Period	50 9/1-11/15	Still Present		3,700
Crow, fish	Present Period	75 9/15-30	5 11/15		1,500
Red-tailed Hawk	Present Period	8 9/15-12/31	Still Present		900
Red-shouldered Hawk	Present Period	5 9/1-10/31	Still Present		500
Rough-legged Hawk	1 12/1	6 12/15-31	Still Present		100
Marsh Hawk	Present Period	35 11/1-12/31	Still Present		2,500
Osprey	2 9/1-7	2 9/1-7	1 10/22		20

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1751
Form 1 1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge **Prime Hook** Months of **September** to **December** 19 **70**

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
II. Shorebirds, Gulls and Terns:										
Least Sandpiper	Present	Period	15	9/1-15	1	11/5				600
Dunlin	1	9/14	150	10/31-11/5	Still	Present				2,800
Dowitcher	Present	Period	50	9/14-21	1	10/30				600
Stilt Sandpiper	Present	Period	35	9/14-16	30	9/16				150
Semipalmated Sandpiper	Present	Period	200	9/1-7	5	11/15				3,500
Western Sandpiper	Present	Period	55	9/14	5	10/15				300
Buff-breasted Sandpiper	1	9/1	3	9/14	1	9/16				5
Sanderling	Present	Period	50	9/15-31	Still	Present				1,500
American Avocet	1	10/1	2	10/5	1	11/5				35
Northern Phalarope	1	9/1	1	9/1	1	9/1				1
Great Black-backed Gull	Present	Period	25	10/20-11/20	Still	Present				2,000
Herring Gull	Present	Period	300	12/1-30	Still	Present				20,000
Ring-billed Gull	Present	Period	150	11/1-30	Still	Present				10,000
Laughing Gull	Present	Period	250	9/8-15	1	10/30				3,000
Forster's Tern	Present	Period	6	9/1-7	2	9/14				50
Least Tern	1	9/1	1	9/1	1	9/1				1

(over)

NR-1A From _____ to _____

5RF-8/69

(1)	(2)		(3)		(4)	(5)			(6)
III. Doves and Pigeons:									
Mourning dove									
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
Duck hawk									
Horned owl									
Magpie									
Raven									
Crow									
Sparrow Hawk	Present Period		25		10/1-12/31	Still Present			2,500
Barn Owl	Present Period		8		9/1-12/31	Still Present			960
Screech Owl	Present Period		20		11/1-12/31	Still Present			1,250
Barred Owl	Present Period		10		9/1-12/31	Still Present			1,200
Short-eared owl	3	12/6	6		12/1-31	Still Present			200

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1750b
Form NR-1B
(Rev. Nov. 1957)
5RF-2/70

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge **Prime Hook** For 12-month period ending August 31, 1970

Reported by **N. Holgersen** Title **Wildlife Biologist**

(1) Area or Unit Designation	(2) Habitat Type	(2) Habitat Acreage		(3) Use-days	(4) Breeding Population	(5) Production
#1	Crops	99	Ducks	16,845	70	40
	Upland	111	Geese	19,100		
	Marsh	1,540	Swans			
	Water	70	Coots	70		
	Total	1,850	Total	36,015		
#2	Crops	272	Ducks	101,895	180	160
	Upland	158	Geese	187,435		
	Marsh	1,488	Swans			
	Water	150	Coots	120		
	Total	2,068	Total	289,450		
#3	Crops	207	Ducks	197,225	125	120
	Upland	193	Geese	64,750		
	Marsh	4,346	Swans			
	Water	600	Coots	2,400		
	Total	5,346	Total	264,375		
#4	Crops	240	Ducks	164,430	175	180
	Upland	1,084	Geese	196,715		
	Marsh	120	Swans			
	Water	1,444	Coots	455		
	Total		Total	361,600		
Total	Crops	578	Ducks	480,395	550	500
	Upland	732	Geese	468,000		
	Marsh	8,458	Swans			
	Water	940	Coots	3,045		
	Total	10,708	Total	951,440	550	500
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

5RF-2/27/70

3-1750c
Form -1C
(Sept. 1960)
5RF-10/64

WATERFOWL HUNTER KILL SURVEY

Refuge **Prime Hook**

Year 19**70**

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
7			Green-winged Teal	287				
			Canada Goose	210				
			Black Duck	133				
			Mallard	89				
			Wood Duck	36				
			Pintail	14				
			Bufflehead	8				
			Scaup	8				
			Coot	8				
			Baldpate	5				
			Blue-winged Teal	5				
			Gadwall	5				
			Merganser (Hooded)	4				
			Merganser (Red Breasted)	1				
			Merganser (Unidentified)	2				
			Ring-necked Duck	4				
			Shoveler	4				
			Canvasback	2				
			Ruddy	2				
			Brant	1				
			Redhead	1				
			Unidentified Duck	11				
	1,472	8,832	TOTALS	840	150	990	1,472	990

(over

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 per cent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 per cent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spend hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 per cent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

REPORT OF BANDING ON Prime Hook REFUGE - CALENDAR YEAR 1970

Geese	Method of Trapping*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Canada														
Brant														
Ducks														
Mallard	Cage								29	14	6			49
Black	Cage								88	55	38			181
Gr.-Winged Teal	Cage									2				2
Bl.-Winged Teal	Cage									1				1
Wood Duck														
Pintail	Cage								1	1	1			3
Eider														
Total Waterfowl														236
Other														
Mourning Dove	Cage/Mist								73/2					75
Woodcock														

Quotas: Canada geese _____; Mallard _____; Blacks 500; Other Wood Duck - 200, M. Dove - 1,000 (State)

*Method of Trapping: CAN - Cannon Net; CAGE - Cage; MIST - Mist Net; NITE - Night-lighting

Form NR-1D

5RF-1/3/67

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge **Prime Hook** Months of **January** to **April** 19**70**

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods observed	Estimated Total	percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite Quail	**1,300 acres of upland, marsh and woodland edge.**	**7**	**-**	**-**	**50:50**	**50**	**-**	**-**	**180**	**Estimates based on bag checks and random field observations by permanent personnel**
Ring-necked Pheasant	**1,300 acres of upland, marsh and woodland edge.**	**217**	**-**	**-**	**50:50**				**6**	**Estimates based on two Spring Crowing Counts.**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use Correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: Spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge **Prime Hook** Months of **May** to **August** 19**70**

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods observed	Estimated Total	per-centage	Hunting	For Re-stocking	For Research	Esti-mated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite	**1,300 acres of upland and edges**	**4.3**	**3**	**125**	**50:50**				**300**	**Estimates based on random field observations**
Ring-necked Pheasant	**1,300 acres of upland and edges**	**-**	**0**	**0**	**40:60**				**5**	**Estimates based on random field observations**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use Correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: Spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1752
Form R-2
(April 1946)

UPLAND GAME BIRDS

Refuge **Prime Hook** Months of **September** to **December** 19 **70**

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods observed	Estimated Total	per-centage	Hunting	For Re-stocking	For Research	Esti-mated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite Quail	**1,300 acres of upland marsh and woodland edge.**	**4**	**6**	**150**	**1:1**	**100**			**425**	**Estimates based on random field observations.**
Ring-necked Pheasant	**1,300 acres of upland marsh and woodland edge.**	**10**	**-**	**-**	**9:1**	**90**			**125**	**A total of 113 cockbirds were released by State for Special Season.**

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use Correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: Spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

Form NR-3
(June 1945)

BIG GAME

Refuge Prime Hook Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals			(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, Total Acres Habitat	Number	Hunting	Restocking	Research	Predation	Disease	Winter Loss	Number and Source	Period of Peak Use	As of Dec. 31	
White-tailed Deer	6,355 acres of upland, marshland, and woodland.	15	12			1*				60	30	1:1

* - One by fox hounds.

Remarks:

NR-3
5RF 1/69

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1754
rm NR-4
(June 1945)

SMALL MAMMALS

Refuge **Prime Hook** Year ending April 30, **1970**

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types and Total Acres of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator Control	Restocking	For Research	Permit Number	Trappers Share	Refuge Share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Population
Grey squirrel	300 **Timber**	23	80											200
Cottontail rabbit	1,300 **Upland**	55	240											300
Woodchuck	1,300 **Upland**	18												120
Opossum	1,300 **Upland**	7												200
Striped skunk	1,300 **Upland**	16												80
Mink	3,500 **Marsh and water**	700												5
Muskrat	3,500 **Marsh and water**	5												800
River Otter	4,600 **Marsh and water**	480												15
Red Fox	6,000 **Upland and marsh**	75												80
Grey Fox	6,000 **Upland and marsh**	600												10
Raccoon	6,000 **Upland and marsh**	30												200

REMARKS:

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headings listed.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

3-1755
Form NR-5
607

DISEASE

Refuge Prime Hook Year 1970

Botulism

Period of outbreak None

Period of heaviest losses

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage)

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life

Remarks

Lead Poisoning or other Disease

Kind of disease Lead Poisoning

Species affected Canada Goose

Number Affected

Species	Actual Count	Estimated
Canada Goose	50	100

Number Recovered -

Number lost 100

Source of infection Lead pellets.

Water conditions seasonable following an August-September drought.

Food conditions limited aquatics, ample green browse and grain available nearby.

Remarks Source of lead is unknown-- could be on or off refuge. The afflicted geese seem to end up on Unit IV; where they are "safe" from the hunters. A gross lead-shot sampling in 1969 evidenced no lead shot on areas sampled, within Refuge.

Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

ANNUAL ~~MONTHLY~~ RECREATIONAL USE REPORT

Refuge name: **Prime Hook**
State: **Delaware**

State Code **0 8** (1-2) | Congressional District Code **0 0** (3-4) | Refuge Code **5 0 2** (5-7) | Report Period Yr. **7 0** Mo. (8-11)

(Card Columns). . . . . (12-13) (14-18) (19-25)		VISITS FOR THE ~~MONTH~~ Year	
ACTIVITY	Code	Total Number	Total Hours
Hunting: Big Game	01	470	2,820
Upland Game	02	730	2,190
Waterfowl	03	1,472	8,832
Other Migratory	04		
Other	05	300	1,200
Bow	06	60	180
Fishing: Salt Water	07	1,920	3,840
Warm Water	08	945	1,890
Cold Water	09		
Environmental Education	10		
Wildlife Photography	11	60	120
Wildlife Observation	12	1,870	3,740
Conducted Programs	13		
Field Trials	14		
Wildlife Trails	15		
Wildlife Tours/Routes	16	520	520
Visitor Contact Stations	17	2,356	2,356
Camping (wildlife related)	18		
Picnicking (wildlife related)	19	580	580
Wildlife Interpretive Center	20		
Off-site Programs	21	146	23

(Card Columns). . . . . (12-13) (14-18) (19-25)		VISITS FOR THE ~~MONTH~~ Year	
ACTIVITY	Code	Total Number	Total Hours
On-Site Programs	22		
*Miscellaneous Wildlife	23	445	445
[redacted]			
Swimming	24		
Boating	25	80	160
Water Skiing	26		
Camping	27		
Group Camping	28		
Picnicking	29		
Horseback Riding	30	15	15
Bicycling	31	45	45
Winter Sports (Skating)	32	35	70
Fruit, Nut and Vegetable Collecting	33	35	70
*Miscellaneous Non-Wildlife	34		
Peak Load Day	35	250	[redacted]
Actual Visits	36	8,237	
Fee Area Use	37		
Number of Fee Areas	38	(14-18)	
Fee Collections	39	$	
Collection Costs	40	$	

Form 3-123
(Revised July 1969)

*Use reverse side to indicate types of activities summarized under miscellaneous codes 23 and 34. MAKE NO OTHER ENTRIES ON FACE OF THIS FORM.

Code 23: Inquiries regarding Refuge's public-use programs.

3-1758
For. AR-8
(Rev. Jan. 1956)
5RF-10/64

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge **Prime Hook** County **Sussex** State **Delaware**

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return Harvested		Government's Share or Return Unharvested		Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Field Corn (cereal)	327	13,250 bu.			7	350 bu.	349	**Wheat Browse**	76
Soybean (cereal)	49	125 bu.					49	**Rye Grass Cover Crop**	280
Winter Wheat (browse)					76	2 t.	76	**Rye Browse**	22
Buckwheat (cereal)					12	240	12	**Wildlife Pasture**	247
Wildlife Pasture (browse)					3		3	**Semi-permanent Grass-lands**	360
								Buckwheat (cereal)	12
								Fallow Ag. Land **Field #321**	46

No. of Permittees: Agricultural Operations 5 Haying Operations 2 Grazing Operations 2

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue
Alfalfa	120	11	275.00
Timothy- Clover	30	15	375.00
Pasture Hay*	2	2	
*** Harvested as a "Special Condition" under a Cooperative Farming Agreement.**			
Hay - Wild	15	15	30.00

GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
1. Cattle	254**	1,446	2,051.75	360
2. Other	** - Over six months old.			
1. Total Refuge Acreage Under Cultivation				689
2. Acreage Cultivated as Service Operation				111

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or state.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-4**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
May 23	Salt-marsh mosquito (*Aedes sollicitans.*)	75% of Unit 1, northeastern 20% of Unit 2, southeastern 25% of Unit 3 and northern half of Unit 4.	2,675	Abate 4E, ULV*	85.6 lbs.	1 fluid oz. (.032 lbs. a.i.)/A.	None	Airplane
July 21	Salt-marsh mosquito (*Aedes sollicitans*)	Central eastern section of Unit 1, central southern portion of Unit 3, small area in northwestern quarter of Unit 4.	500	Abate 4E, ULV*	32.0 lbs.	2 fluid oz. (.064 lbs. a.i.)/A.	None	Airplane
August 14	Salt-marsh mosquito (*Aedes sollicitans*)	South central section of Unit 3 and northwestern portion of Unit 4.	230	Abate 4E, ULV*	14.7 lbs.	2 fluid oz. (.064 lbs. a.i.)/A	None	Airplane

10. Summary of results (continue on reverse side, if necessary)

* Ultra-low volume.

On the basis of pre and post-spray checks, the State Mosquito Control Division determined the kill of larvae to be 85 to 90%, 80% and 95%, respectively, for the three applications.

Permission to double the application rate subsequent to the May 23 spray was granted by the Regional Office (6/29/70).

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-7**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
June 15 thru July 15	Broad-leaved weeds.	Fields #309, 310, 311, 312, 314, 318, 326.	124	2,4-D low volatile ester.	62 lbs. a.e.	.05 lbs. a.e. /A	Water 10-30 gal. per acre	Boom sprayer
	"	Fields #304, 307	22	"	11 lbs. a.e.	"	"	"
	"	Fields #205, 301	42	"	21 lbs. a.e.	"	"	"
	"	Fields #101, 102, 201, 202	146	"	73 lbs. a.e.	"	"	"

10. Summary of results (continue on reverse side, if necessary)

"Control was satisfactory.

NR-12 5RF-2/70

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-8**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
June 10	Johnsongrass	Fields #321, 318, 314, 313, 312, 301,	5	Dalapon	40 lbs. a.e.	8 lbs. a.e./A.	Water 40 gal./A.	Drop Nozzle and Hand Wand
June 25	Johnsongrass	Fields #321, 318	5	Dalapon	40 lbs. a.e.	8 lbs. a.e./A.	Water 40 gal./A.	Drop Nozzle and Hand Wand

10. Summary of results (continue on reverse side, if necessary)

Additional and concerted control measures (mechanical and chemical) will be necessary to control infestation in Field #321. Control results, to date, have not impeded the Johnsongrass' infestation rate. Approximately 1/3 of Field #321 now infested.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-9**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
July 9	Phragmites	Boundary signs along public highways, all units.	1	Dowpon	22 lbs. a.e.	22 lbs. a.e./A.	Water 200 gal./A.	Handwand

10. Summary of results (continue on reverse side, if necessary)

Satisfactory control.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-10**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
May 20	Grass, Broad Leaved Weeds	Headquarters	.12	Ureabor (dry granular)	15 lbs.	10 lbs./1000 sq. ft.	-	Hand spread

10. Summary of results (continue on reverse side, if necessary)

Results fair. Chemical used to prevent weed growth next to buildings and on parking areas to enhance appearance and decrease free hazards.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-11**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
June 1	Annual grasses, Broad-leaved Weeds	Fields #106 and 107	49	Trifluralin	25 lbs. a.e.	.5 lbs. a.e. /A.	Water 30 gal./A.	Boom sprayer

10. Summary of results (continue on reverse side, if necessary)

Results fair; could have been better had the soil been less water saturated.

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

ANNUAL REPORT OF PESTICIDE APPLICATION

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395

Refuge: **Prime Hook**

Proposal Number: **PH-70-12**

Reporting Year: **1970**

Dates of Application (1)	List of Target Pests(s) (2)	Location of Area Treated (3)	Total Acres Treated (4)	Chemical(s) Used (5)	Total Amount of Chemical Applied (6)	Application Rate (7)	Carrier and Rate (8)	Method of Application (9)
August 12	Purple loose-strife	Marsh in north-eastern quarter of Unit 2	1	Ammonium sulfamate (Ammate X)	60 lbs.	60 lbs/A.	Water, 100 gals/ Acre	Bean sprayer, handgun
August 26	Purple loose-strife	Marsh in north-eastern quarter of Unit 2	2	Ammonium sulfamate (Ammate X)	120 lbs.	60 lbs/A.		

10. Summary of results (continue on reverse side, if necessary)

Target plants completely brown and dead in appearance.

Counselors Duck Fowl Shot Count

2d Charge Pending On Game Violation

From the Dover Bureau

DOVER—Two Sussex County men have had one game law violation charge against them dropped, but another is still pending.

The two, David B. Coxe Jr. and W. Howard Thompson, both lawyers, appeared yesterday before U.S. Commissioner Paul H. Boswell. The federal official said after a two hour hearing that he will have a decision within a week on the charge of "taking migratory waterfowl over or on a baited area."

Both Coxe and Thompson acted as their own attorneys.

Originally, the two were also charged with taking migratory waterfowl before the opening time last Dec. 12. However, Boswell granted a motion to dismiss the charge on the basis that the information did not mention the opening time or the time of the alleged shooting.

Boswell's decision will state whether there is probable cause to warrant trial in U.S. District Court.

David C. Kirkland, a U.S. game management agent, said he spotted the men Dec. 12 in the Broadkill Beach area east of the Prime Hook Wildlife Refuge.

Between 6:25 a.m. and 6:45 a.m., Kirkland said, he heard seven shots fired from the hunters' blind. The official opening time was 6:45 a.m. Kirkland also said that at 6:35 a.m. one duck was knocked down by a shot fired by the two men.

Kirkland maintained that the ducks the two men were shooting at were attempting to light on a small pond nearby which had been baited with shelled corn.

Coxe said the commissioner had heard no testimony that there was a connection between the birds that flew over the blind and those that had lighted on the pond.

Coxe also attempted to prove that Kirkland did not have a clear view from his observation point of the blind and the pond.

The Sunday Bulletin SECTION 1
PHILADELPHIA, Sunday, November 8, 1970

Goose, Duck Counts High At Bombay, Prime Hook

Bombay Hook — Both bird watchers and hunters have reason to be happy.

Cold weather in the north has caused wild fowl to leave their habitat there sooner than usual and wing their way to refuges in Delaware and other locations along the Atlantic Flyway.

Robert G. Nelson, manager of the sprawling Bombay Hook Wildlife Refuge, east of Smyrna, said a census shows large numbers of Canada geese in both the Bombay Hook refuge and at the Prime Hook area.

An aerial survey conducted by Norman Holgersen, biologist for the U. S. Fish and Wildlife Service, the agency with the responsibility for operating the refuges, found some 28,000 Canada geese and 10,600 ducks of various species in the Bombay Hook area.

At Prime Hook, some 26,500 Canada geese and 1,810 ducks were counted.

"Waste corn" in private farm fields nearby the refuges is expected to be a big attraction to draw the fowl within range of hunters' guns, Nelson said.

Those who enjoy observing the birds through binoculars or telescopes have vast flocks on which they may focus.

Evening Journal, Wilmington, Del. * * * Thursday, September 17, 1970

Prime Hook Will Be Open For Hunting

The Prime Hook National Wildlife Refuge near Milford will again be open to public hunting this season.

In cooperation with the State Division of Fish and Wildlife, waterfowl hunting will be allowed on portions of the refuge, with an opening of the season Oct. 31.

Waterfowl hunting permits will be issued daily, on a first come, first served basis, from two hours before legal shooting time until 3 p.m., at the federal-state check station near Waples Pond, at intersection of 5 and 14. Advanced reservations will not be accepted.

Access into the waterfowl hunting area is allowed through designated access points, allowwing no more than three per blind. Small boats, low-horsepower motors and stout push poles, are required to reach the area's 26 blinds. All permittees must check out through the checking station by one hour after sunset.

5,100 acres of the refuge will be open to upland game hunting. Special permits are not required. The archery deer hunting began Sept. 1 and will continue through Oct. 31. Shotgun deer hunting opens on Nov. 6, continuing through Nov. 14, except on Sunday, Nov. 8.

Additional information and maps are available at the refuge headquarters, 1.6 miles north of Route 16, Broadkill Beach Road, or by calling or writing the Refuge Manager, Bombay Hook National Wildlife Refuge, R.D. No. 1, Box 147, Smyrna Del. 19977. Phone: 653-9345.

Delaware State News
Second News Front
Dover, Del., Thursday, September 17, 1970— 17

Hickel To Tour Delaware Coast

By JACK COSTELLO
DSN Staff Writer

WASHINGTON, D.C. — Delaware's conservation and pollution programs will come to attention for review tomorrow as Interior Secretary Walter J. Hickel makes a quick tour of the state's coastal areas.

One of Hickel's focal points is to be the Diamond Shamrock Co. at Delaware City.

The secretary said recently that plants have reduced to almost nil the amount of mercury pollution discharged into the nation's streams, and that Diamond Shamrock, Delaware's mercury polluter, has dropped from a 29-pound-per-day discharge into the Delaware River to about 3 pounds at the present time.

Hickel is expected to be accompanied on his Delaware tour by Rep. William V. Roth (R-Del), Austin N. Heller, Secretary of Natural Resources and Environmental Control, and Dr. William Gaither of the College of Marine Studies at the University of Delaware.

He is to arrive in Delaware City around 3 p.m., board a boat and go up-river to New Castle, presumably observing river discharges along the way.

His eight-hour trip begins with a flight over Chincoteague-Ocean City area, then he'll fly north to Rehoboth Beach.

From there the secretary will survey the Great Dune in the Fort Miles recreation area. The dune has recently been the subject of hot controversy between the Army and Delaware conservationists.

Hickel then expects to fly over the Primehook Wildlife Refuge, Big Stone Beach (where an artificial island for an oil terminal has been suggested), Bombay Hook, and the Chesapeake and Delaware Canal, before arriving at Delaware City.

BEAUTIFUL BROADKILL BEACH Is Easily Located...

Situated on the clear blue waters of the Delaware Bay, Broadkill Beach is just 5 minutes by boat from the resort of Lewes Beach, Delaware and only 15 minutes by car from Rehoboth Beach - the Nation's Summer Capital. Being only 88 miles from Washington, D. C. Beautiful Broadkill is the ideal resort for you and your family to relax and enjoy your vacation.

BEAUTIFUL DELAWARE BAY WHERE

Swimming at Broadkill Beach is suited for both the beginner and the expert. The calm cool water is perfect for an early morning dip or that lazy afternoon swim. The bay's sandy bottom and crystal clear water is entirely safe for all swimmers.

A NATURAL ENVIRONMENT

Lush cedars and beautiful yellow Yucca fringe the sandy white beaches. Adjoining this peaceful resort is a large wildlife refuge. The marshland and its location on the Atlantic migratory flyway makes this an excellent area for seasonal game and bird. As a haven for wildlife, you will never be disturbed by the crowds of large commercial resorts.

LAST SANDY BEACH WATERFRONT LOTS AVAILABLE IN AREA

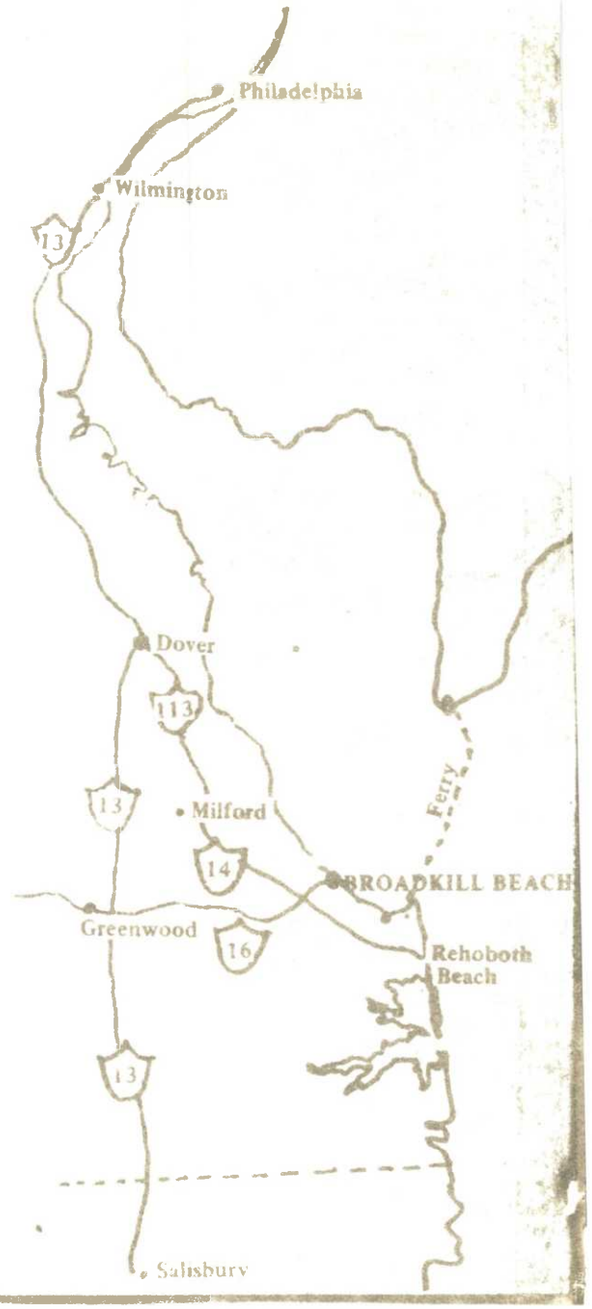
FREE BOAT RAMP PRIVILEGE WITH PURCHASE

BUY NOW

FREE TITLE INSURANCE - NO CLOSING COSTS

BEACH OFFICE OPEN DAILY FROM 11 A.M. TO 5 P.M. - SUNDAY TO 6 P.M.

DIRECTIONS: Located adjacent to Lewes, Del. Take Route 14 Highway to Route 16. Turn east 4 miles to Broadkill Beach. Office on North Beach.



BACK BAY Co.

A Thompson - Layton Enterprise

Office at Broadkill Tel. (302) 684-4453 or (302) 856-2658

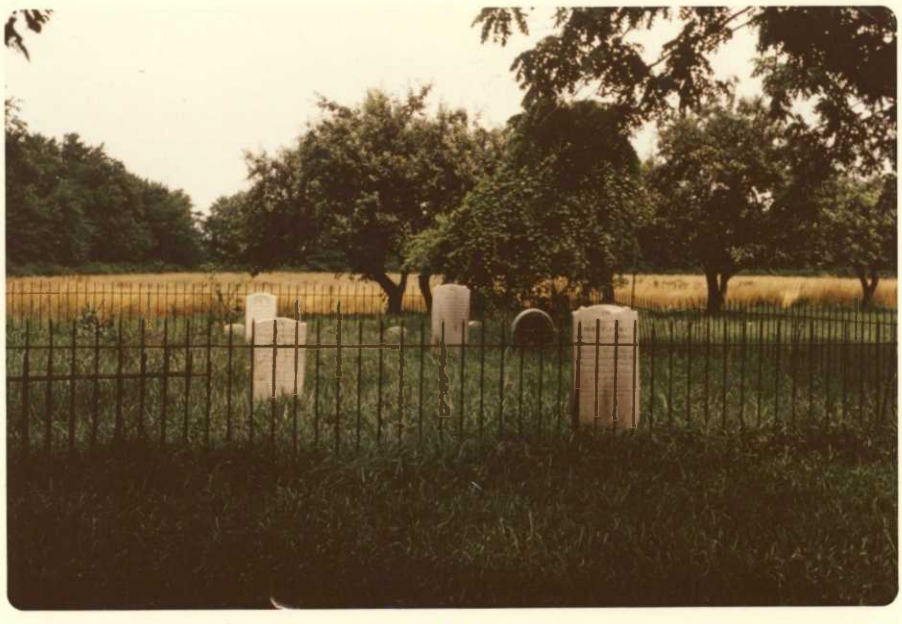
Refuge land acquisition is 57% complete. The green area (6,355 acres) within the red exterior boundary, encompassing 10,700 acres, represents the piecemeal-fashion of land attainment

Gage 4/8/70
PH-70-R4-7

Ever feel a step away from the grave? The Refuge office is literally so. This area has great potential . . . historically speaking; burials date back to 1818. An interpretive plaque and reconstruction of the wrought-iron fence is scheduled.

Nugent 6/22/70
PH-70-R6-11


PRIME HOOK NATIONAL WILDLIFE REFUGE
SUSSEX COUNTY, DELAWARE
VICINITY MAP



The Check Station used in coordinating the Federal/State Waterfowl Hunting Program. The station is capable of being operated on a self-service basis (instructions stenciled on a wallboard inside booth); yet during peak-use periods it is advantageous to have it manned.

Gage 1/70
PH-70-R1-11

Federal and State personnel coordinating efforts in the regrassing of one of the twenty-six, water-accessible blinds.

Nugent 10/28/70
PH-70-R9-15


PRIME HOOK
WATERFOWL CHECKING STATION
CHECKING STATION

Purple loosestrife . . . pretty, yet potentially hazardous due to its rapid encroachment capabilities onto more nutritional wildlife-food habitat areas; early detection and eradication is most favorable.

Holgersen 8/26/70
BH-15-70-10

A once-infested loosestrife area, two weeks after the application of Ammate X. Superficial results look encouraging -- time will tell.

Holgersen 8/26/70
BH-15-70-19

Improving Mother Nature? Hardly . . . just hoping to make her work a little easier via the placement of osprey nesting poles.

Holgersen 2/18/70
BH-1-70-20

Some of our management efforts are indeed appreciated.

Gage 4/16/70
PH-70-R4-18

Talk about airport landing-approach problems . . . .

Nugent 10/19/70
PH-70-R8-16

A waterfowl smorgasbord: what was scheduled to be an eight-acre buckwheat field, ended-up consisting of buckwheat, millet, and even soybeans!

Nugent 10/14/70
PH-70-R8-3

Vegetation is imperative for food and cover but why can't it recognize and stay away from man-made boundaries like this honeysuckle-laden fence?

Gage 5/20/70
PH-70-R5-20

Even though range-maps show the Prickly Pear Cactus extending northward into Massachusetts, it is nonetheless considered a unique and beautiful plant in this area.

Holgersen 6/19/70
BH-8-70-3

The new Fowler Beach Road public parking area which is adjacent to the much crabbed Slaughter Canal.

Nugent 10/19/70
PH-70-R8-17

A Refuge concession? Nope . . . just an adjacent landowner's brainstorm (?); the proprietors even went so far as to capitalize on our address by addressing their establishment as "The Society for the Preservation of Primehook Wildlife, Ltd." Their definition of "wildlife" is a bit removed from the Bureaus'. The poor mailman is still delivering us wholesale price lists for booze. It's enough to drive a man to drink . . . maybe that's their objective!

Nugent 6/23/70
PH-70-R6-13


Schaefer
REFUGE TAVERN
THE
REFUGE
TAVERN
LIQUORS
Cold Beer To Go

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE Prime Hook MONTHS OF September TO December, 1970

(1) Species	Sept. 1 - 7 (1)	8 - 14 (2)	15 - 21 (3)	22 - 28 (4)	(2) October 29 - 5 (5)	6 - 12 (6)	13 - 19 (7)	20 - 26 (8)	Nov. 27 - 2 Aerial (9)	3 - 9 (10)
Swans:										
Whistling										
Trumpeter										
Geese:										
Canada				75	50	100	15,000	25,000	26,500	10,000
Cackling										
Brant										
White-fronted										
Snow							5	10	50	125
Blue										
Other										
Ducks:										
Mallard	50	50	50	25	25	25	25	55	55	50
Black	200	200	200	250	250	300	300	450	450	400
Gadwall	50	50	25	25						
Baldpate									15	10
Pintail	5	5						150	150	50
Green-winged teal	150	150	150	150	150	150	150	900	900	1,200
Blue-winged teal	200	200	200	100	100	50	50	25		
Cinnamon teal										
Shoveler				5					10	
Wood	200	200	200	200	200	225	225	225	225	100
Redhead										
Ring-necked										
Canvasback										
Scaup										
Goldeneye										
Bufflehead										
Ruddy										
Other										

3-1750a
Cont. NR-1
(Rev. March 1953)
5RF - 4/68

WATERFOWL
(Continuation Sheet)

REFUGE Prime Hook MONTHS OF September TO December, 1970

(1) Species	Nov. 10 - 16 (11)	Weeks of reporting period (2) 17-23 (12)	24-30 (13)	Dec. 1-7 (14)	8-14 (15)	15-21 (16)	22-28 (17)	29-31 (18)	(3) Estimated waterfowl days use	(4) Production Broods seen	Estimated Total
Swans:											
Whistling											
Trumpeter											
Geese:											
Canada	6,000	6,000	3,000	2,000	3,500	2,500	2,500	2,500	723,075		
Cackling											
Brant											
White-fronted											
Snow	20	20	25	30	10	60			2,485		
Blue											
Other											
Ducks:											
Mallard	50	100	100	100	100	100	100	100	7,720		
Black	400	375	375	375	350	300	300	300	39,225		
Gadwall									1,050		
Baldpate	10	10	10	10	10				525		
Pintail	50	30	30	30	50	50	50	10	4,580		
GW teal	1,000	1,000	300	200	50	50	50	25	46,975		
BW teal									6,475		
Cinnamon teal											
Shoveler				5					140		
Wood	50	50							14,700		
Redhead											
Ring-necked											
Canvasback											
Scaup											
Goldeneye											
Bufflehead											
Ruddy											
Other											
Coot:											

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans			
Geese	725,560	26,550	
Ducks	121,390	1,810	
Coots			

SUMMARY

Principal feeding areas: Units 2, 3 and 4.

Principal nesting areas:

Reported by: Norman E. Holgersen

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

(1) Species: In addition to the birds listed on form, other species occurring on the refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Prime Hook Months of September to December 19 70

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
Pied-billed Grebe	Present	Period	25	9/1-10/31	Still	Present				2,000
Great Blue Heron	Present	Period	25	9/1-11/15	Still	Present				2,500
Green Heron	Present	Period	100	9/1-30	1	10/15				3,100
Cattle Egret	Present	Period	75	9/1-15	1	11/23				1,300
Common Egret	Present	Period	5	9/1-15	1	10/15				200
Snowy Egret	Present	Period	250	9/10-15	1	10/31				2,500
Louisiana Heron	1	9/1	1	9/1	1	9/1				1
Black-crowned night Heron	Present	Period	25	9/1-30	Still	Present				1,100
Least Bittern	Present	Period	50	9/1-15	5	10/15				1,000
American Bittern	Present	Period	50	9/1-15	Still	Present				1,500
Glossy Ibis	Present	Period	10	9/14-	3	10/30				100
King Rail	Present	Period	100	9/15-10/15	Still	Present				5,000
Clapper Rail	Present	Period	250	9/15-10/15	Still	Present				12,000
Virginia Rail	Present	Period	150	9/15-10/15	Still	Present				7,500
Sora	50	9/7	100	9/15-10/15	10	10/15				5,000
Common Gallinule	Present	Period	25	9/1-15	5	10/15				400
II. Shorebirds, Gulls and Terns:										
Semipalmated Plover	Present	Period	50	9/1-7	5	10/15				500
Killdeer	Present	Period	50	9/7-21	Still	Present				3,000
American Golden Plover	7	9/1	18	9/16	3	11/5				225
Black-bellied Plover	Present	Period	90	11/1-10	Still	Present				4,000
Ruddy Turnstone	Present	Period	50	11/5-10	Still	Present				1,800
American Woodcock	Present	Period	250	11/5-11	Still	Present				6,000
Common Snipe	Present	Period	300	9/15-11/1	Still	Present				11,000
Spotted Sandpiper	Present	Period	10	9/1-15	1	9/20				150
Greater Yellowlegs	Present	Period	110	9/15-30	1	11/23				3,500
Lesser Yellowlegs	Present	Period	30	9/1-15	1	11/5				1,000
Knot	7	9/1	7	9/1	7	9/1				7
Pectoral Sandpiper	Present	Period	15	9/1-15	1	11/5				600
White-rumped Sandpiper	1	9/1	2	9/14	2	9/14				5

(over)

(1)	(2)	(3)	(4)	(5)	(6)
III. Doves and Pigeons:					
Mourning dove White-winged dove	Present Period	800	10/15-31	Still Present	28,000
IV. Predaceous Birds:					
Golden eagle					
Duck hawk					
Great Horned owl	Present Period	30	9/1-12/31	Still Present	3,600
Magpie					
Raven					
Crow, Common	Present Period	50	9/1-11/15	Still Present	3,700
Crow, fish	Present Period	75	9/15-30	5 11/15	1,500
Red-tailed Hawk	Present Period	8	9/15-12/31	Still Present	900
Red-shouldered Hawk	Present Period	5	9/1-10/31	Still Present	500
Rough-legged Hawk	1 12/1	6	12/15-31	Still Present	100
Marsh Hawk	Present Period	35	11/1-12/31	Still Present	2,500
Osprey	2 9/1-7	2	9/1-7	1 10/22	20

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

If more space is needed for listing species in Group I, you can X out heading for Group II and continue listing. Retype heading of Group II below, or list Group II on a second page. Here, too, if the list is long, you can X out both headings and retype heading for Group II at top of form. This can eliminate the necessity for a third page of form.

Explanation of column headings:

(1) Species: Use correct names as found in the A.O.U. Checklist.
(2) First Seen: The first migration record for the species for the reporting period.
(3) Peak Numbers: Estimated number and inclusive dates when peak population of the species occurred.
(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1751
Form NR-1A
(Aug. 1952)

MIGRATORY BIRDS
(Other than Waterfowl)

Refuge Prime Hook Months of September to December 19 70

(1) Species	(2) First Seen		(3) Peak Concentration		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Inclusive Dates	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Use
I. Water and Marsh Birds:										
II. Shorebirds, Gulls and Terns:										
Least Sandpiper	Present Period		15	9/1-15	1	11/5				600
Dunlin	1	9/14	150	10/31-11/5	Still Present					2,800
Dowitcher	Present Period		50	9/14-21	1	10/30				600
Stilt Sandpiper	Present Period		35	9/14-16	30	9/16				150
Semipalmated Sandpiper	Present Period		200	9/1-7	5	11/15				3,500
Western Sandpiper	Present Period		55	9/14	5	10/15				300
Buff-breasted Sandpiper	1	9/1	3	9/14	1	9/16				5
Sanderling	Present Period		50	9/15-31	Still Present					1,500
American Avocet	1	10/1	2	10/5	1	11/5				35
Northern Phalarope	1	9/1	1	9/1	1	9/1				1
Great Black-backed Gull	Present Period		25	10/20-11/20	Still Present					2,000
Herring Gull	Present Period		300	12/1-30	Still Present					20,000
Ring-billed Gull	Present Period		150	11/1-30	Still Present					10,000
Laughing Gull	Present Period		250	9/8-15	1	10/30				3,000
Forster's Tern	Present Period		6	9/1-7	2	9/14				50
				(over)	NR-1A	From ____ to ____				5RF-8/69
Least Tern	1	9/1	1	9/1	1	9/1				1

(1)	(2)		(3)	(4)	(5)		(6)
III. Doves and Pigeons:							
Mourning dove							
White-winged dove							
IV. Predaceous Birds:							
Golden eagle							
Duck hawk							
Horned owl							
Magpie							
Raven							
Crow							
Sparrow Hawk	Present Period		25	10/1-12/31	Still Present		2,500
Barn Owl	Present Period		8	9/1-12/31	Still Present		960
Screech Owl	Present Period		20	11/1-12/31	Still Present		1,250
Barred Owl	Present Period		10	9/1-12/31	Still Present		1,200
Short-eared owl	3	12/6	6	12/1-31	Still Present		200

INSTRUCTIONS

See Wildlife Refuges Manual Section 3321-24, "Wildlife Records".

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(4) Last Seen: The last refuge record for the species during the season concerned.
(5) Production: Estimated number of young produced based on observations and actual counts.
(6) Total: Estimated species days use (average population X no. days present) of refuge during the reporting period.

3-1750c
Form NR-1C
(Sept. 1960)
5RF-10/64

WATERFOWL HUNTER KILL SURVEY

Refuge Prime Hook

Year 19 70

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
7			Green-winged Teal	287				
			Canada Goose	210				
			Black Duck	133				
			Mallard	89				
			Wood Duck	36				
			Pintail	14				
			Bufflehead	8				
			Scaup	8				
			Coot	8				
			Baldpate	5				
			Blue-winged Teal	5				
			Gadwall	5				
			Merganser (Hooded)	4				
			Merganser (Red Breasted)	1				
			Merganser (Unidentified)	2				
			Ring-necked Duck	4				
			Shoveler	4				
			Canvasback	2				
			Ruddy	2				
			Brant	1				
			Redhead	1				
			Unidentified Duck	11				
	1,472	8,832	TOTALS	840	150	990	1,472	990

(over

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 per cent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 per cent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spend hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 per cent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

REPORT OF BANDING ON Prime Hook REFUGE - CALENDAR YEAR 1970

Geese	Method of Trapping*	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Totals
Canada														
Brant														
Ducks														
Mallard	Cage								29	14	6			49
Black	Cage								88	55	38			181
Gr.-Winged Teal	Cage									2				2
Bl.-Winged Teal	Cage									1				1
Wood Duck														
Pintail	Cage								1	1	1			3
Eider														
Total Waterfowl														236
Other														
Mourning Dove	Cage/Mist								73/2					75
Woodcock														

Quotas: Canada geese _____; Mallard _____; Blacks 500; Other Wood Duck - 200, M. Dove - 1,000 (State)

*Method of Trapping: CAN - Cannon Net; CAGE - Cage; MIST - Mist Net; NITE - Night-lighting

Form NR-1D

5RF-1/3/67

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Prime Hook Months of September to December 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods observed	Estimated Total	per-centage	Hunting	For Re-stocking	For Research	Esti-mated number using Refuge	Pertinent information not specifically requested. List introductions here.
Bobwhite Quail	1,300 acres of upland marsh and woodland edge.	4	6	150	1:1	100			425	Estimates based on random field observations.
Ring-necked Pheasant	1,300 acres of upland marsh and woodland edge.	10	-	-	9:1	90			125	A total of 113 cockbirds were released by State for Special Season.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use Correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: Spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Prime Hook Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals			(5) Losses			(6) Introductions	(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, Total Acres Habitat	Number	Hunting	Restocking	Research	Predation	Disease	Winter Loss	Number and Source	Period of Peak Use	As of Dec. 31	
White-tailed Deer	6,355 acres of upland, marshland, and woodland.	15	12			1*				60	30	1:1

Remarks: * - One by fox hounds,

NR-3
5RF 1/69

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1755
Form NR-5
60701

DISEASE

Refuge Prime Hook Year 1970

Botulism

Period of outbreak None

Period of heaviest losses

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage)

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life

Remarks

Lead Poisoning or other Disease

Kind of disease Lead Poisoning

Species affected Canada Goose

Number Affected Species	Actual Count	Estimated
Canada Goose	50	100

Number Recovered -

Number lost 100

Source of infection Lead pellets.

Water conditions seasonable following an August-September drought.

Food conditions limited aquatics, ample green browse and grain available nearby.

Remarks Source of lead is unknown-- could be on or off refuge. The afflicted geese seem to end up on Unit IV; where they are "safe" from the hunters. A gross lead-shot sampling in 1969 evidenced no lead shot on areas sampled, within Refuge.

Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

ANNUAL ~~MONTHLY~~ RECREATIONAL USE REPORT

Refuge name: Prime Hook
State: Delaware

State Code 08 (1-2) | Congressional District Code 00 (3-4) | Refuge Code 502 (5-7) | Report Yr. | ~~Mo.~~ Period 70 | (8-11)

(Card Columns). . . . . (12-13) (14-18) (19-25) ACTIVITY	Code	VISITS FOR THE ~~MONTH~~ Year: Total Number	Total Hours
Hunting: Big Game	01	470	2,820
Upland Game	02	730	2,190
Waterfowl	03	1,472	8,832
Other Migratory	04		
Other	05	300	1,200
Bow	06	60	180
Fishing: Salt Water	07	1,920	3,840
Warm Water	08	945	1,890
Cold Water	09		
Environmental Education	10		
Wildlife Photography	11	60	120
Wildlife Observation	12	1,870	3,740
Conducted Programs	13		
Field Trials	14		
Wildlife Trails	15		
Wildlife Tours/Routes	16	520	520
Visitor Contact Stations	17	2,356	2,356
Camping (wildlife related)	18		
Picnicking (wildlife related)	19	580	580
Wildlife Interpretive Center	20		
Off-Site Programs	21	146	23

(Card Columns). . . . . (12-13) (14-18) (19-25) ACTIVITY	Code	VISITS FOR THE ~~MONTH~~ Year: Total Number	Total Hours
On-Site Programs	22		
*Miscellaneous Wildlife	23	445	445
[redacted]			
Swimming	24		
Boating	25	80	160
Water Skiing	26		
Camping	27		
Group Camping	28		
Picnicking	29		
Horseback Riding	30	15	15
Bicycling	31	45	45
Winter Sports (Skating)	32	35	70
Fruit, Nut and Vegetable Collecting	33	35	70
*Miscellaneous Non-Wildlife	34		
Peak Load Day	35	250	[redacted]
Actual Visits	36	8,237	[redacted]
			[redacted]
Fee Area Use	37		
Number of Fee Areas	38	(14-18)	
Fee Collections	39	$	
Collection Costs	40	$	

Form 3-123
(Revised July 1969)

*Use reverse side to indicate types of activities summarized under miscellaneous codes 23 and 34. MAKE NO OTHER ENTRIES ON FACE OF THIS FORM.

Code 23: Inquiries regarding Refuge's public-use programs.

3-1758
Form NR-8
(Rev. Jan. 1956)
5RF-10/64

1970

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Prime Hook County Sussex State Delaware

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return Harvested		Government's Share or Return Unharvested		Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Field Corn (cereal)	327	13,250 bu.			7	350 bu.	349	Wheat Browse	76
Soybean (cereal)	49	125 bu.					49	Rye Grass Cover Crop	280
Winter Wheat (browse)					76	2 t.	76	Rye Browse	22
Buckwheat (cereal)					12	240	12	Wildlife Pasture	247
Wildlife Pasture (browse)					3		3	Semi-permanent Grass-lands	360
							440	Buckwheat (cereal)	12
									750
								Fallow Ag. Land Field #321	46

No. of Permittees: Agricultural Operations 5 Haying Operations 2 Grazing Operations 2

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue
Alfalfa	120	11	275.00
Timothy- Clover	30	15	375.00
Pasture Hay*	2	2	
* Harvested as a "Special Condition" under a Cooperative Farming Agreement.			
Hay - Wild	15	15	30.00

GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
1. Cattle	254**	1,446	2,051.75	360
2. Other	** - Over six months old.			
1. Total Refuge Acreage Under Cultivation				689
2. Acreage Cultivated as Service Operation				111

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or state.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.